Geel 2000 Language Schools

Science Department



Primary (4)

Second term

(2023-2024)



Name:..

Class: ....

Concept 3.1 :- Devices and Energy

Activity (1): What kinds of energy transfer must occur for light from the sun to power a cell phone?

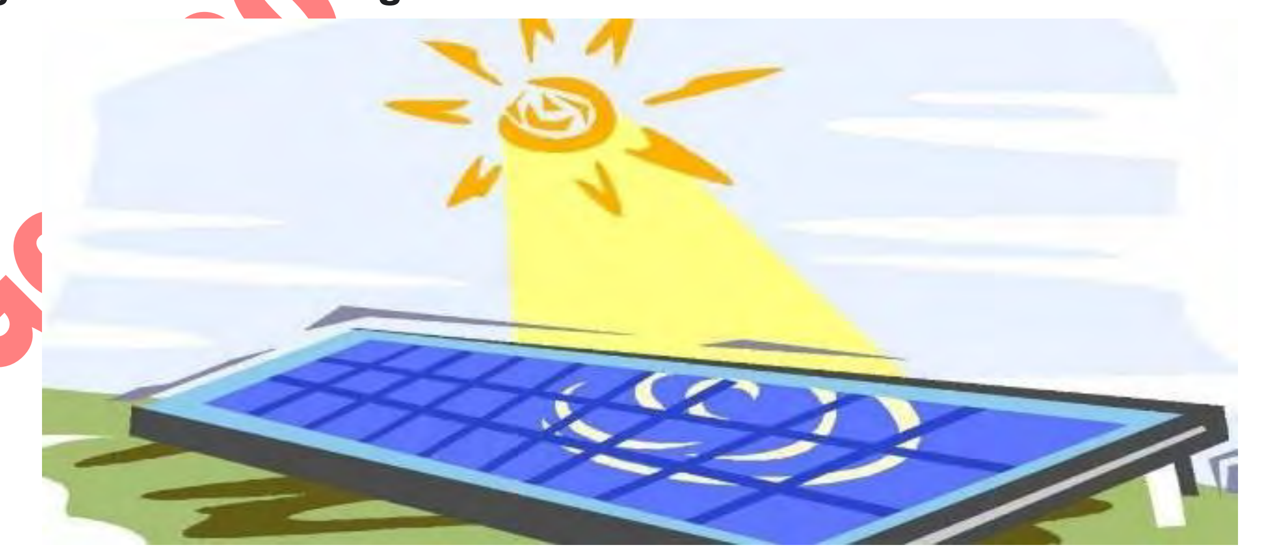
Technology can helps us turn **light energy** from the sun into **different forms of energy** that can help power a cell phone

Example: Solar panels **convert** solar energy into electrical energy to poweror charge our phones.



Example:

Solar cells :- is a device that **converts light energy to electric energy to light house and charge devices.**



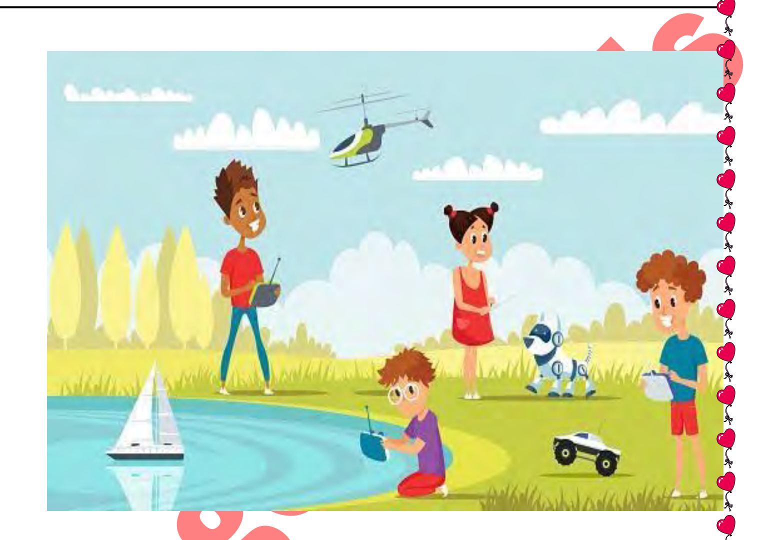
Activity 2 Energy in Remote-Controlled Car

Every day you may use devices that need **energy** to work.
Have you ever thought about where that energy comes from?

Many toys can be operated remotely.

Such as

1. Remote-controlled cars
2. trucks
3. planes
4. boats
5. Drones



All these devices need energy to move and do tasks such as: turning corners, moving remote arms, or operating cameras.

How do remote-controlled toys get their energy?

Allow of these devices **use batteries** **as a powersource** **(Chemical energy is converted into electricity)**.

When the batteries are exhausted or run outcharge, they must be:

1.Recharged (Plug the device)

2.Replaced with new ones

➢ **What happens if...?**

-Batteries of remote -controlled toy car run out.

The car will stop.

Activity 3: Mars Rover Curiosity

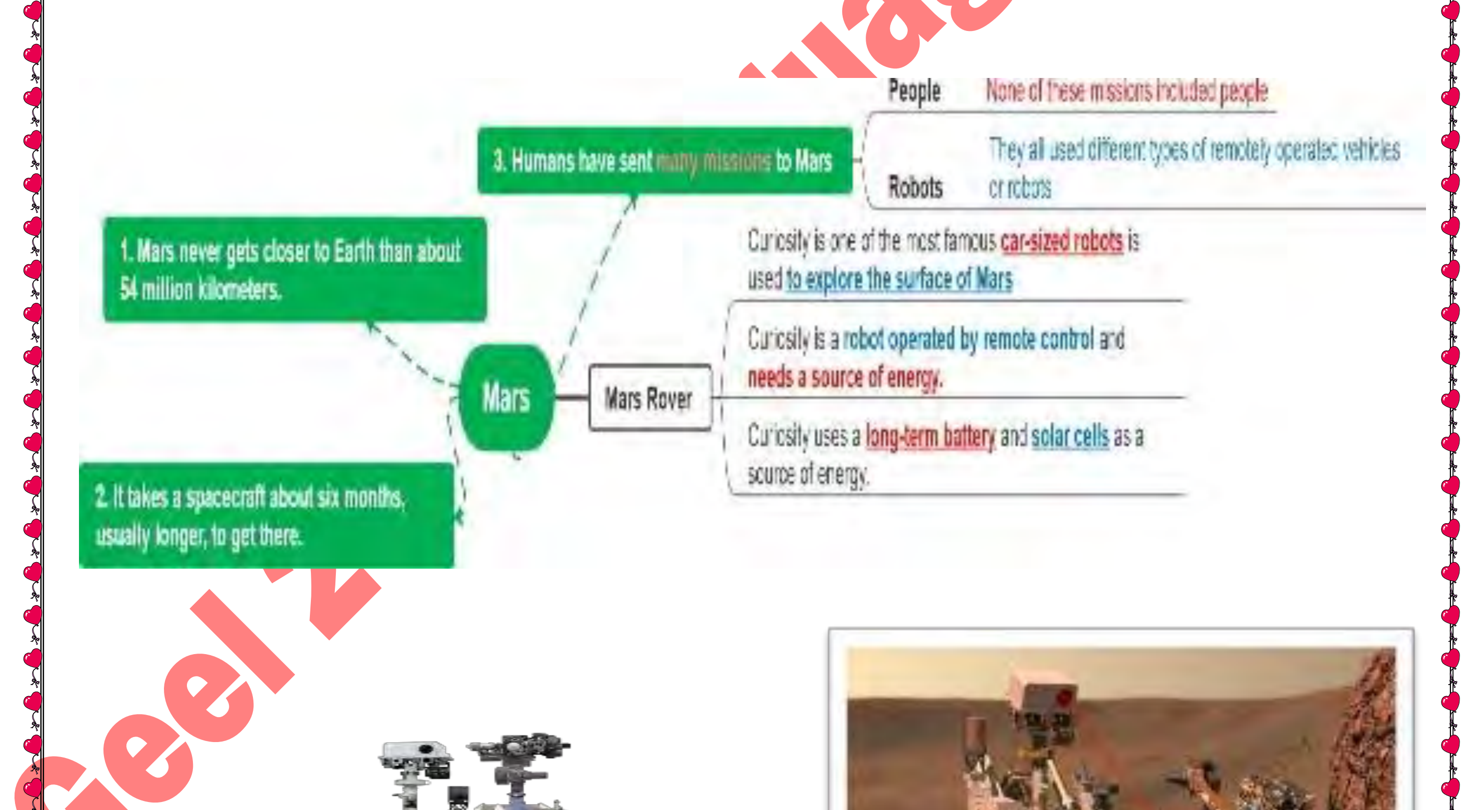
1- **Mars rover curiosity is a robot which travels to mars to explore mars planet .**

2- The curiosity rover use solar panels to recharge their batteries .

-The solar energy is converted into electrical energy then into kinetic energy and thermal energy when it starts to move .

What energy sources could they use?

Curiosity converts Solar energy to electric, kinetic, and thermalenergy to work sensory systems .



Activity 4: What Do You Already Know About Devices and Energy? **How does the energy change?**

Device name	Input energy (consumed energy)	Output energy (produced energy)
Hair dryer	Electric energy	Thermal Energy Sound Energy Kinetic Energy
Curiosity rover	Solar Energy	Electric Energy Kinetic Energy Thermal Energy
Washing machine	Electric Energy	Thermal energy Kinetic energy Sound energy

Remote control car	Chemical Energy	Kinetic Energy
Cloth machine	Electric Energy	Kinetic Energy Thermal Energy Sound Energy

Give reason :

You feel warm when you rub your hands

-because the kinetic energy is converted into thermal energy

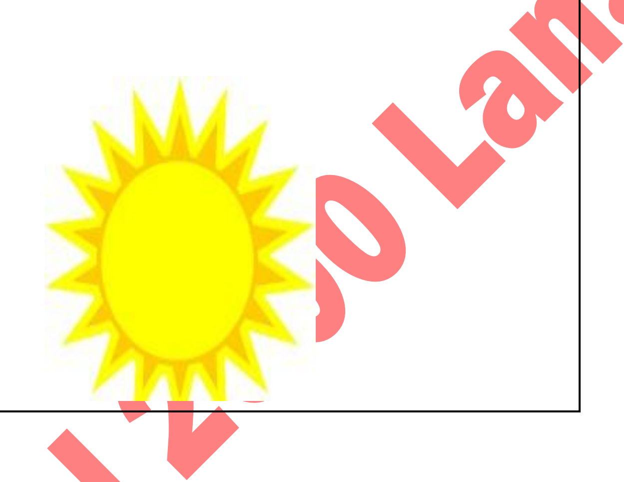
What is the source of energy, or energy input and the output for each device ?

1.Bike	2. Phone:	3. Saw

Activity 5: **Energy Chains**: How would you trace energy from its source to a device in use?

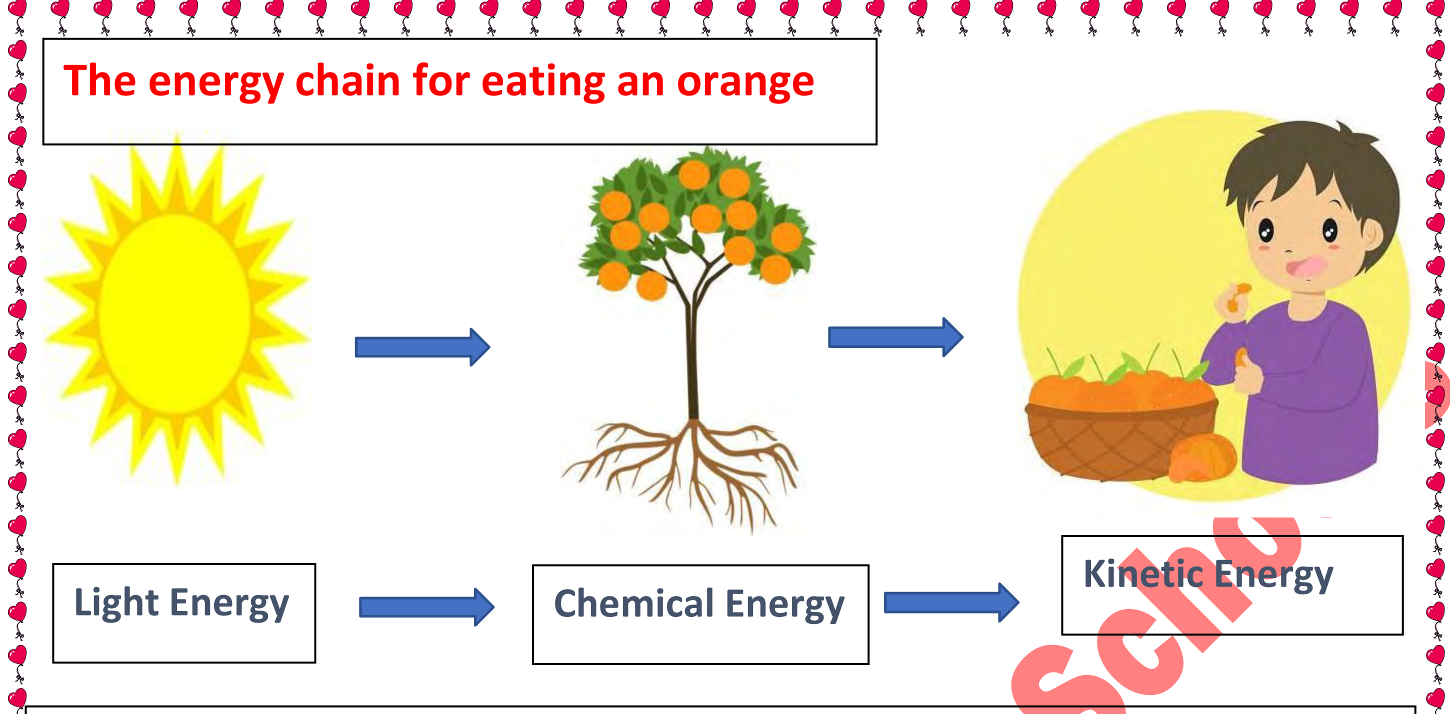
Sun is the main source of energy on earth

Energy chains often start with the sun



To know **how energy gets inside the device we use**. We can draw energy chains that show **the path of energy** from **the sun** to different **devices**.

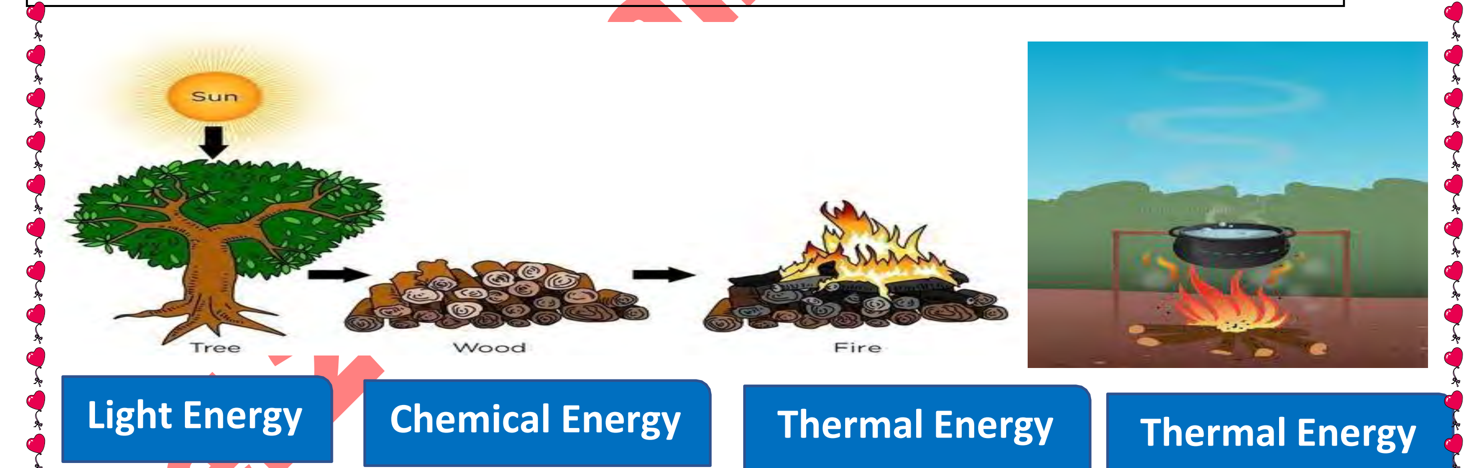
The energy chain for eating an orange



This **energy chain** starts with energy from the sun hitting the Earth as light. A plant, such as an **orange tree**, transforms that **light energy** into stored **Chemical energy** as it makes sugars. When you eat the orange, your body uses the chemical energy to move.

The chemical energy stored inside the food converts into kinetic energy.

The energy chain for heating a pan of water over a fire



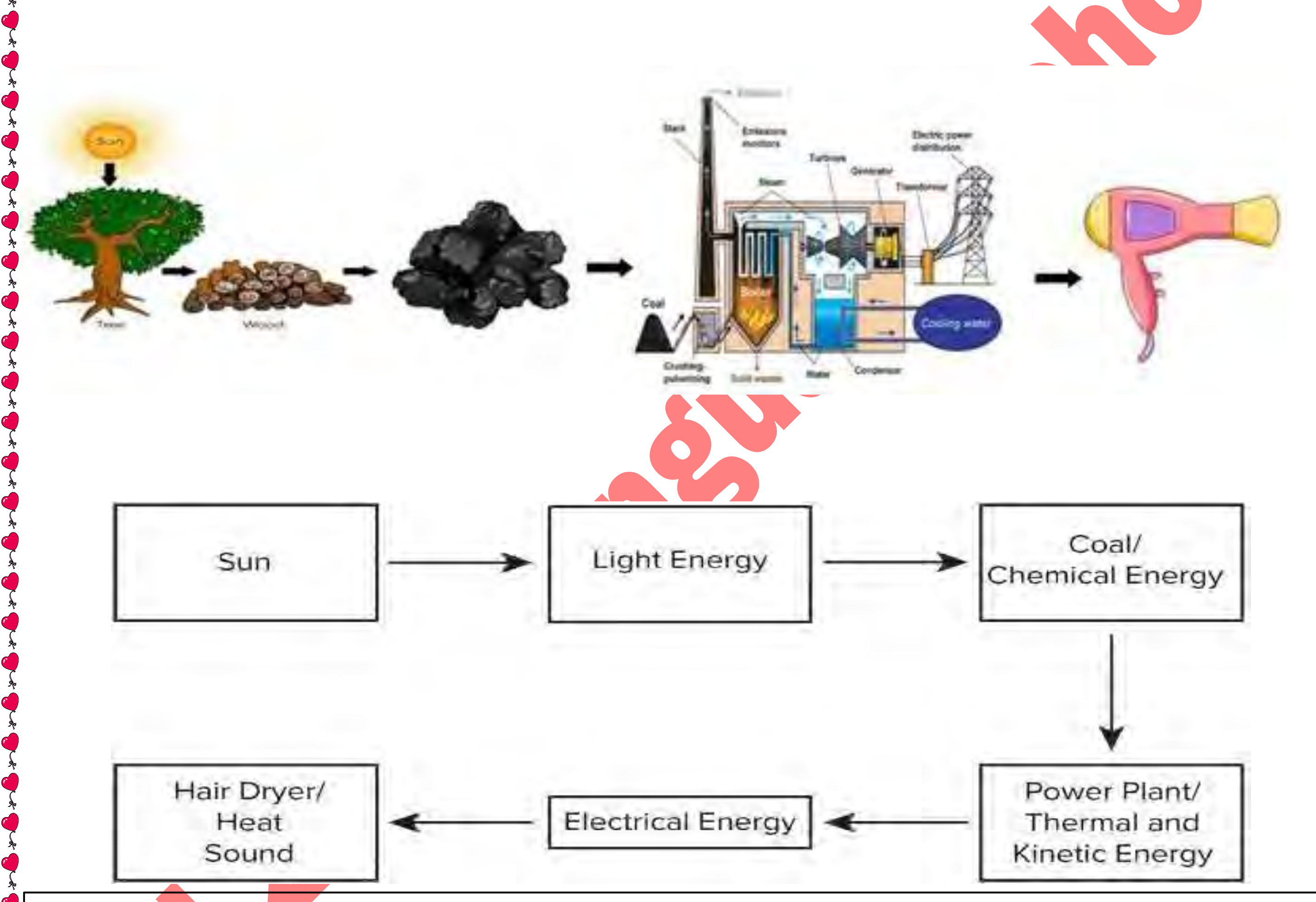
Energy from the sun is stored in the tree's wood as a chemical energy to grow up, when we burn the wood produced heat energy to heat water or cook food.

1. Sun converts nuclear energy to light energy	2. Wood/tree absorbs light energy and changes it to chemical energy.	1. firing Wood produces thermal energy	2. Thermal energy transfers from firing wood to the pot of water to heat it.

The energy chain for a hair dryer

The energy chain for a hair dryer **is more difficult**. The electrical energy that powers a hair dryer reaches it along an electric cord that is made of copper.

The electrical energy comes from a power plant of some type. Perhaps it burned **coal** or **gas** to make this electrical energy. But **where did this energy originally come from?**



A diagram shows the energy chain for movement of energy starting with sun/nuclear energy and ending with hair dryer/heat sound.

Power plants burned coal, a form of chemical energy. Coal was formed millions of years ago from dead trees. The trees have gotten their energy from sunlight.

Not all energy that enters an energy chain reaches the device and gets used as we intend. At each link in the chain, **some energy escapes as other forms**. **It still exists**, but it gets **transformed into another energy form** that is not used by the device. Most of this energy is in the form of heat.

Activity 6:

Determine energy input and output of each device

Small battery clock | Handheld fan | flashlight | Hand bell | Toy car | Lamp

Device	Function	Form (s) of energy in	Forms of Energy out
1. Lamp	Lighting	electrical	Light, thermal

Lesson 3 :

Activity 7 The Conservation of Energy Law

Energy is neither created nor destroyed. But it can be changed from one form to another. - Energy is never lost - Energy is changeable.

Examples of Energy changes from one form to another form

1. Turn on a light bulb, you are starting an energy transformation.

"Electrical energy that powers the light bulb is converted into light and heat energy".

If you hold your hand near some light bulbs, you can feel their heat.



It means that new energy cannot simply be made from nothing, and old energy does not disappear. Energy just changes types and forms

Note :

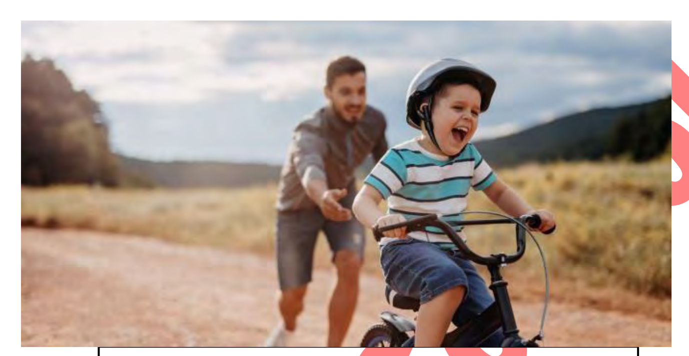
- Not all energy in an energy chain reaches the device .
- most of the wasted energy leaks out in the form of heat .

2. Eating breakfast (Energy conversion)

If you have ever ridden a bike, you are part of a series of events that involve energy conversion



Chemical Energy



Mechanical Energy

Explanation

You eat breakfast so that the Chemical energy in your food will give your body energy. As you push on the bike pedals with your legs, you cause the bike to move. You are changing chemical energy into mechanical energy. The mechanical energy in the bike is also becoming heat energy as the tires rub on the road.

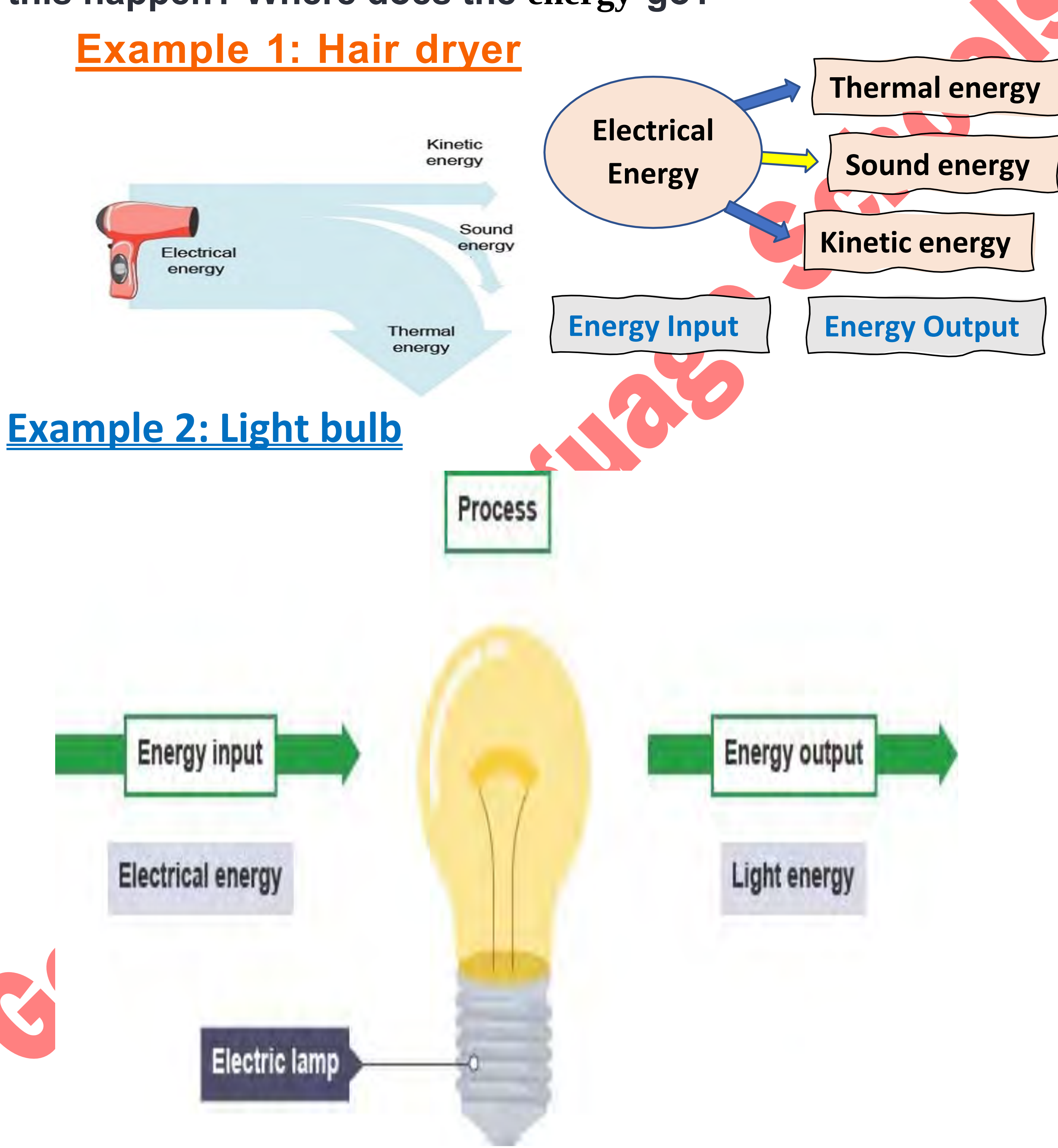
Lesson 4

Activity 8: The flow of energy

No one likes it when their cell phone battery dies. Why does this happen? Where does the energy go?

Example 1: Hair dryer

Example 2: Light bulb



Example 3: Cell phone



Electrical Energy

Chemical Energy → Kinetic Energy

Chemical Energy → Light Energy

Chemical Energy → Sound Energy

Energy enters the device as electrical energy. It is stored in the battery of the phone as **Chemical energy** When a phone is on or in use, the phone changes some of this stored energy. The **chemical energy** in the battery is converted into other types such as light energy, sound energy and kinetic energy when it's vibrating.

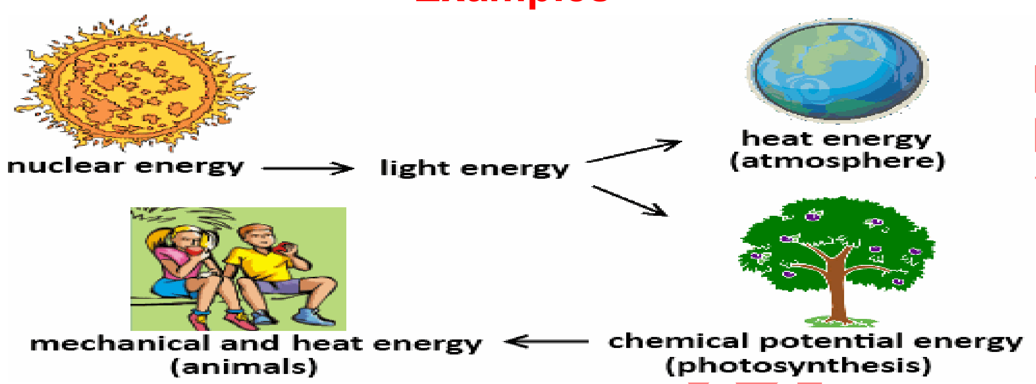
Activity 9 Build an energy chain

Energy Chain

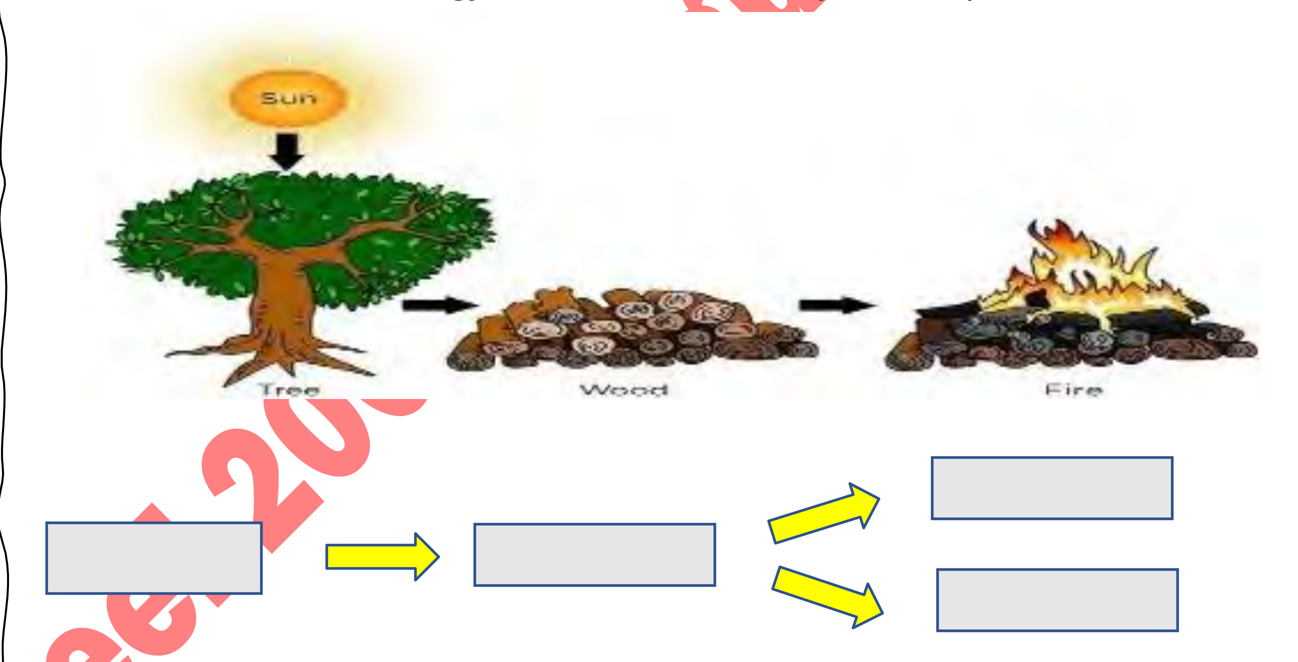
The pathway of energy change from one form to another.

Transfer of energy from one object to another such as heat energy.

Examples



Energy from the sun is stored in the plants which are converted from light energy to chemical energy during photosynthesis process as humans and animals can get their energy to do work when they eat the plants.



Energy from the sun is stored in the tree's wood as a chemical energy to grow up, when we burn the wood produced light and heat energy to boil water or cook food.

Concept 3.2 About fuels lesson (1)

Activity 1: where the fuel we use every day, such as in cars and trucks, comes from?



(Gas station – gasoline – fuel)

Cars and trucks need................ as a source of energy to move.

This energy comes from.....................

When the car is run out of... ...., we should go to gas station.

Gas from the **gas station** comes from oil. We dig oil out of the ground

Oil is a fossil fuel. Fossil fuels are deep in the ground. We use fossil fuels to **heat our houses** and to **supply gas** for our cars.



Activity 2: Can cars move without fuel?

When the car is <u>running out of gasoline</u> , we should go to <u>gas station</u>, Cars need <u>fuel</u>as a source of energy to move. The car <u>burns the gasoline</u> in the engine, and <u>the engine turns the wheel.</u>

Chemical energy  **Kinetic energy**

- **Fuel** : it is any substance that produce thermal energy when it is burned .
- burning of **gasoline** or **natural gas** allows cars to move .

Activity 3: Fuels We Use

Fuel is a source of energy that has many forms and uses.

Forms of fuel

- Natural gas
- Wood
- Gasoline
- Coal

Uses of different forms of fuels

Gasoline	Natural gas	Coal	Wood
Running on vehicles	Used for cooking food	Cooking food and operation some trains	Warming houses

the energy chain of fuel that can be used to get thermal energy :

light energy → chemical energy → thermal energy

(from sun) **(stored inside coal)** **(burning the fuel)**

Lesson 2

Activity 4: Types of fuels

POC	1. Biofuels	2. Fossil fuels
Definition	**It is a type of fuel made fromplants that can be cultivated.**	**It is a type of fuel made from decomposition of the remains of plants and animals that buried for a long period of time .**
Examples	**1.** Wood **2.** Charcoal 3.types of plants like corn, grass, woodchips Wood is the most ancient fuel and is still widely used . - Charcoal made from wood. - Some plants can be turned into liquid fuel as corn ,wood chips and grass.	**1. Oil** **2. Natural gas** **3. Coal** **4. Gasoline**

Advantages	**1. It is a renewable source of energy** **2. Low-cost**	We use fossil fuels daily for **1. lightening houses** **2. Warming houses.** **3. Cooking.** **4. operating cars**
Disadvantages	**1. To get it requires cutting down trees.** **2. removal of forests**	**1. It is a non-renewable source of energy** **2. It causes air pollution** **3. Global warming**
Renewable or Non-Renewable	**Renewable source of energy**	**Non-renewable source of energy**

Fuel can be classified into

1. Renewable sources of energy	2. Non-renewable sources of energy
They are natural materials that can be replaced soon after it is used.	They are the natural materials that are used faster than they can be replaced.
The biofuel such as 1. Wood 2. Charcoal 3. Solar energy 4. Hydroelectricity 5. Wind energy 6. Water	Fossil fuels such as 1. Coal 2. Natural gas 3. Gasoline 4. Gasoline

➢ **Note :**

- **The original source of energy in biofuel and fossil fuel is the sun .**
- **Gasoline is a fuel made from oil .**

Renewable biofuels require careful management

1. For example, using wood as a fuel requires cutting down trees. While some trees may grow to their full height in one person's lifetime.

2.Many trees grow a few centimeters each year. This means that it would take many lifetimes for these trees to reach maturity.

3. Cutting down trees at a faster rate than they can grow leads to **deforestation** which has a variety of negative impacts on our environment.

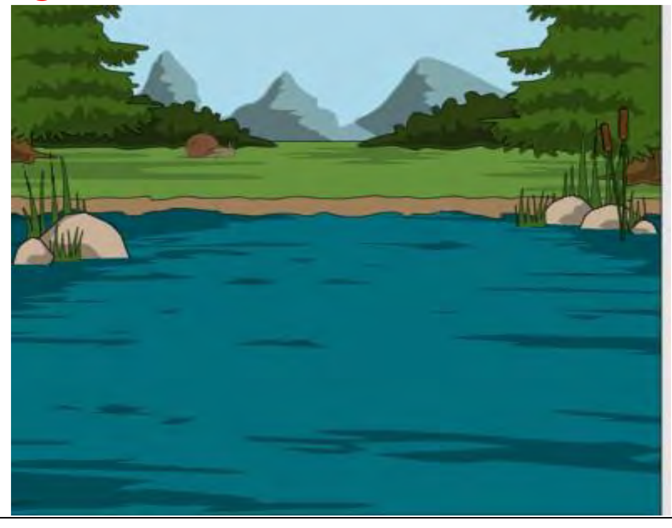
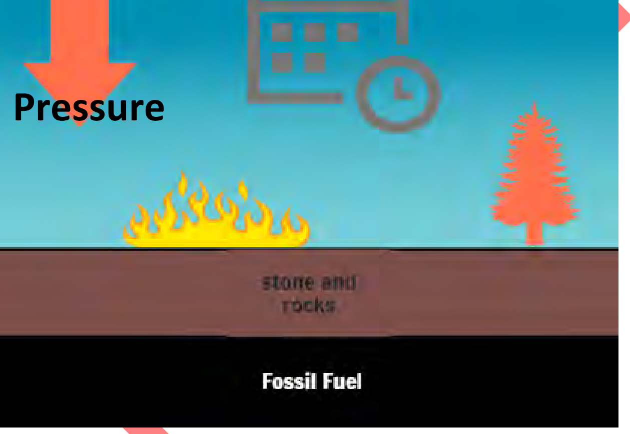
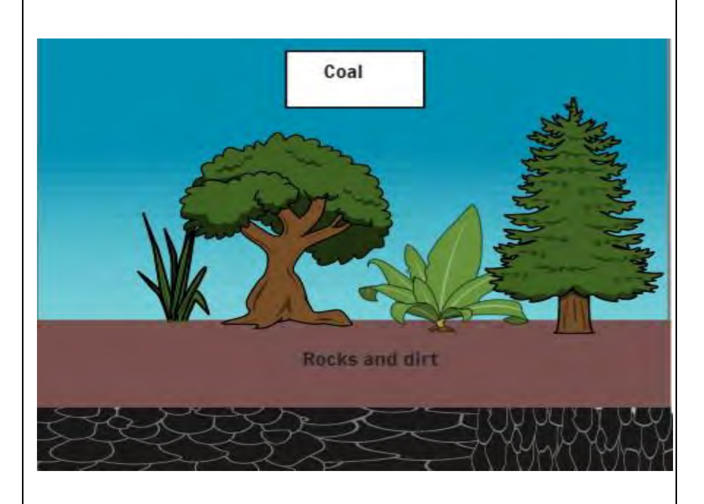


Give reasons for :

Biofuel is a renewable energy?
Because it can be replaced shortly after being used .

Fossil fuel is a non-renewable energy?
Because it take millions of years to be formed.

Activity 5: Formation of coal

<table>
<tr>
<td>1. Swamps exist 350 million years ago.
</td>
<td>2. As living organisms died and trees fell to the bottom of these swamps and ocean where they decomposed.
Over millions of years, they buried by sediment (under Layers of sand and mud).
</td>
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<td>3. Heat and pressure decayed (changed) plants and animals into fossil fuel like coal.

</td>
<td>4. Coal, oil and natural gas are formed from remains of trees and animals, heat and pressure.
Note: coal was formed from remains of plants but oil and gasoline were formed from remains of animals.

</td>
</tr>
</table>

Activity 6: Oil and water: How oil is formed?

Oil and water are among the sources that human use to generate energy.

1. Petroleum Oil

Scientists believe that is formed from the decomposition of sea creatures

Oil is a non-renewable resource of energy.

The chemical composition of water differs from that of oil, so they don't mix

How oil is formed?

1. Oil is formed from thedecomposition of sea creature, as the sea creatures dead, their remains settled onthe ocean's floor.



2. They become covered with layers of sediment and rocks, over many millions of years, the sediment and rock built up more and more layers.



3. All these layers createdgreat heat and pressure which turned the remains into oil and gasoline.



2.Water

Water is a renewable resource of energy.

Human use water flowing to generate electricity

The differences and similarities between water and oil

	Water	Oil
Differences	It is from renewable sources of energy	It is from non-renewable sources of energy
Similarities	Both used for getting energy	

Nonrenewable resource	Renewable resource
Is a natural material that is used faster than it can be replaced. Such as (oil) We use oil faster that new oil can form.	Is a natural material that can be replaced soon after it is used Such as (water)

Although water is a renewable source of energy it must be used very wisely and shouldn't waste be wasted or polluted.

Water may replace as quickly as we need it. So, we must conserve it.

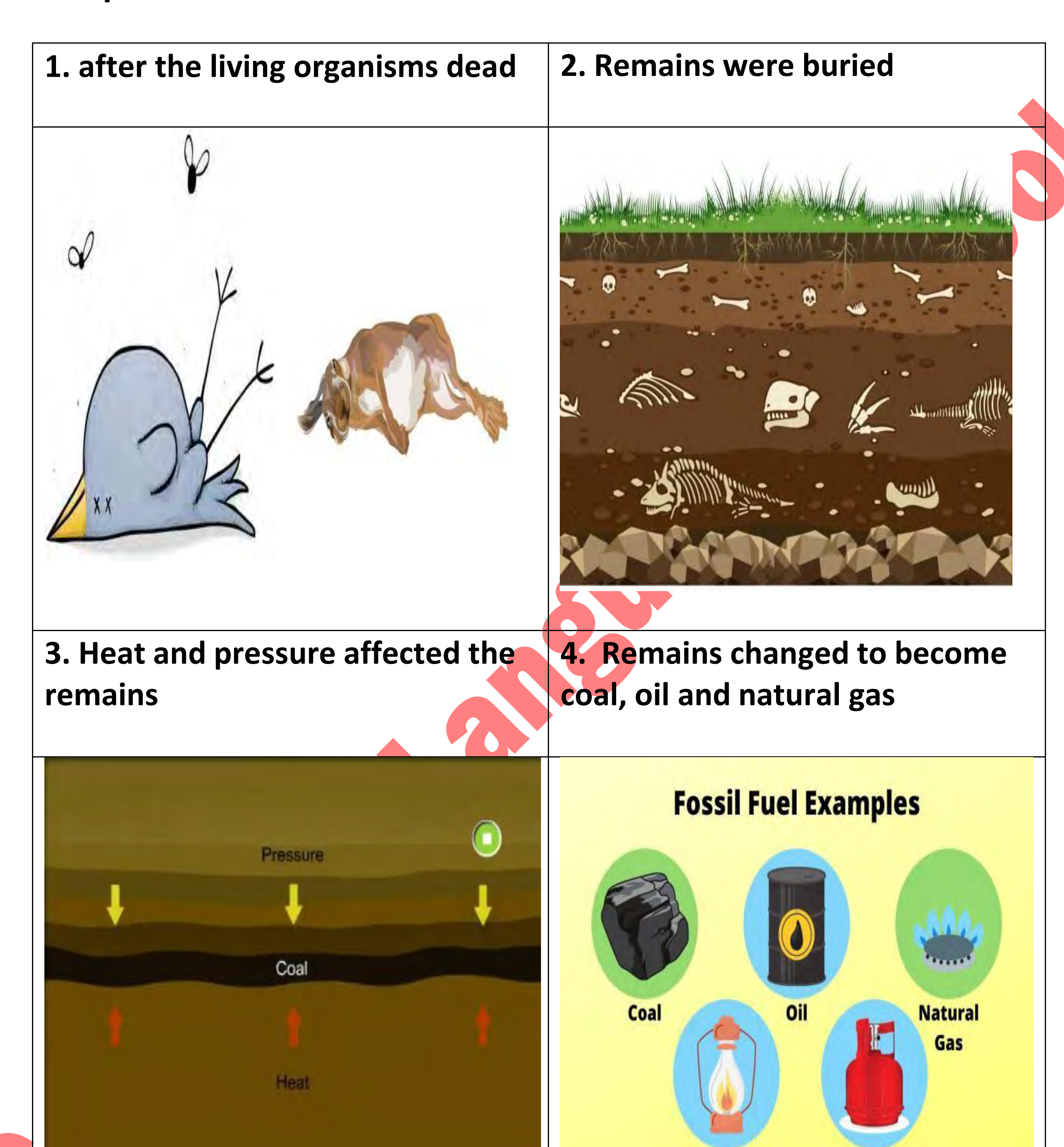
The use of oil and water can be rationalized by

1. Ways to conserve oil consumption	2. Ways to conserve water consumption
-Using public transportation instead ofprivate cars -riding a bike or walking instead of driving a car .	-Growing plants that don't need irrigation water in large quantalities -avoid wasting or polluting water.

Lesson 3

Activity 7: Formation of fossil fuel

The steps involved in the formation of fossil fuels



1. after the living organisms dead	2. Remains were buried
3. Heat and pressure affected the remains	4. Remains changed to become coal, oil and natural gas

Activity 8: Living without electricity

it is important for everyone to understand how much electricity they use andfind ways to conserve energy. In this activity, you will document your experience of spending some time without using electricity.

Document your experience

1. How long were you able to go without using electricity?

....
....
....

2. What types of devices would you normally have used during this period of time? What did you do instead?

....
....
....

3. How did you feel during and after this experience? Do you feel that you normally take electricity for granted?

....
....
....

4. What can you do at home to conserve fuels and avoid wasting electricity?

1. Unplug devices	2. Set aside regular electricity -free times	3. Turn off lights
	ON OFF	

Activity 9: Using Fossil Fuels to Generate Electricity

You already know that gasoline is used to provide energy to make cars move. **But what about the electricity you use to power the lights inyour home? Where does it come from? How are fuels involved in generating electricity?**

How fossils fuels are used to generate electricity.

1. Electric is generated in a power plant or electric power station .

2. when fuel are burned they produce thermal energy.

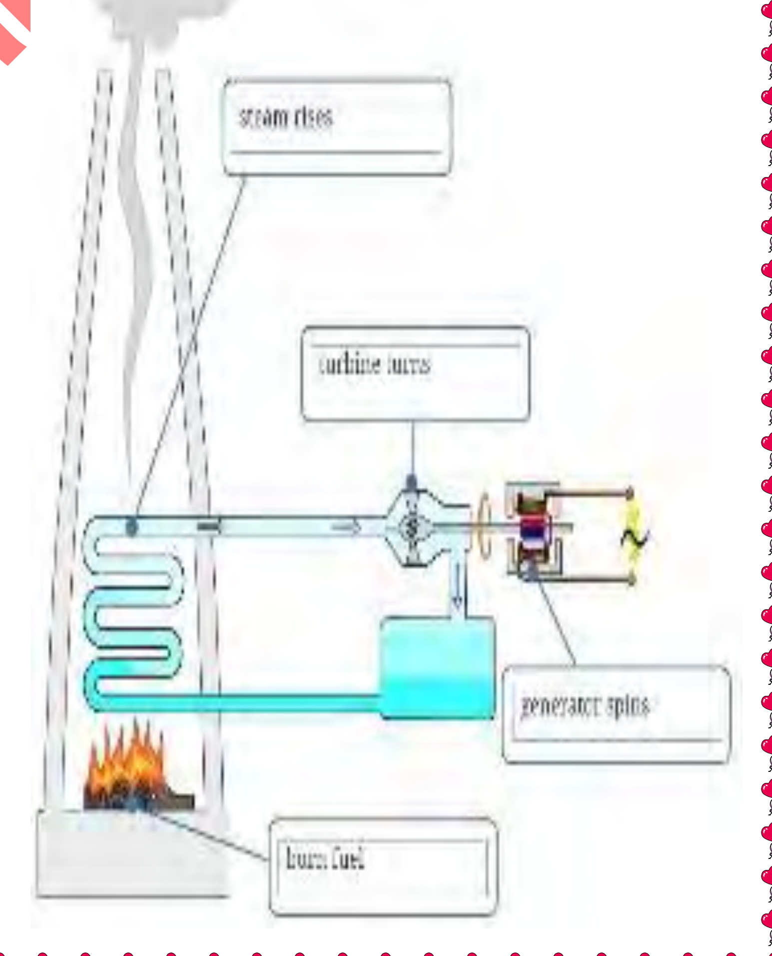
***3.* This is used to heat water to make steam.**

***4.* The steam is used to turn a device called"turbine".**

***5.* This kinetic energy is used to turn agenerator.**

***6.* A generator transforms kinetic energy into electrical energy.**

***7.* The electric energy travels through wires to homes and industries.**



Lesson (4)

Activity 10: Big City Environmental Concerns

- Using Fossil fuels can have negative impacts on the environment.

The reasons of increased pollution in large cities

1. Burning fuel	2. Pesticides	3. The chemicals
		
Can pollute the air (Population demands)	used in farms (Agriculture) can be carried into stream when it rains. -Pollute water and soil.	Used in factories (Industry) lead to pollute air, water and nearby soil.

The danger of pollution
Pollution, in the forms of **runoff**, **smog**, and **ground contamination**, is especially **severe** in large cities.
Example of The negative impact of pollution on respiratory system: Smog from Automobile



1. smog from automobile **emissions (Harmful gases)** causes widespread **irritation to eyes and lungs**.

2. smog is **full of tiny particles** we breathe in irritate our **lungs** and **respiratory system**.

Activity 11: Burning fossil fuels

1. Fossil fuels include (coal – oil – natural gas).
2. Burning fossil fuels **release energy**, people use this energy to **generate electricity**, and this energy also **makes pollution and affects the environment.**

Burning of fossil fuel not only generates electricity but also causespollution.

Burning fuel produce the carbon dioxide gas (Co2) is the main reason for the formation of acid rains and global warming phenomena on Earth.

1. Acid rains	2. Global warming
How it forms **1. Burning fossil fuels produce harmful gas carbon dioxide (CO_2).** **2. Carbon dioxide combines with water vapor in the air to produce carbonic acid which cause acid rains.**	How it forms **1. Burning fossil fuels produce a lot amount of carbon dioxide that collects in the air to form a layer in the atmosphere.** **2. This layer traps heat on Earth. So, the Earth's temperature increases slowly and causing the global warming phenomena.**
Acid rains effects **1. The death of trees** **2. Changing the chemical nature of lakes, which kills fish.** **3. Changing the chemical nature of the soil.** **4. Damage the surfaces of buildings and statues.** 	**Global warming effects** **1. The Earth's temperature increases that causes death a lot of living organisms.** **2. Severe weather (Reading only).** **3. Sea level will rise due to the melting of ice. (Reading only)** 

Lesson (5)

Activity 12: conserving fossil fuels

1. There is a **limited amount** of fossil fuels on Earth.
2. Fossil fuels will **run out** because they take millions of years to be formed asthey can't be replaced as quickly as we use. So, we must conserve the fossil fuels.
3. There are **many ways to conserve** fossil fuels from running out.

Ways of conserving fossil fuels

1-Walking or using bicycles



instead ofdriving car.

1.





2. Turning off lights

3. Replacing fossil fuels with renewable energy



Disadvantages of fossil fuels

1. Burning fossil fuels release harmful gases that cause air pollution.

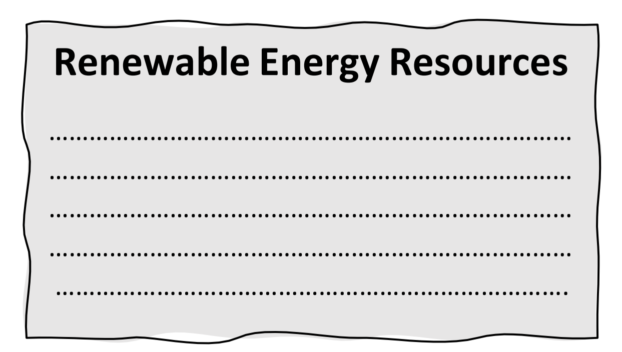
2. Burning fossil fuels cause global warming. (Increasing of the Earth's temperature).

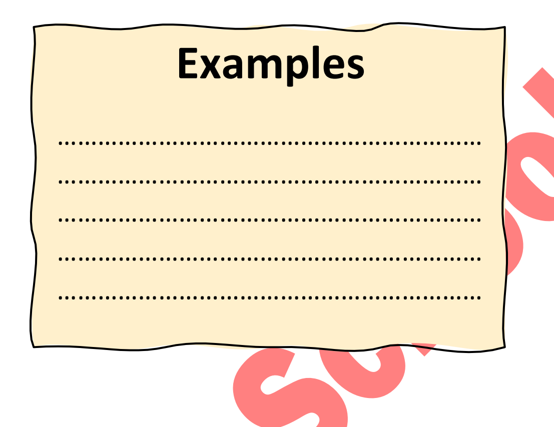


Concept 3.3 : Renewable Energy Resources   lesson (1)

activity (1)

What is the meaning of renewable energy resources?





Renewable Energy Resources

The energy that is generated from natural processes that are not run out

ources

- **1.Solar Energy**
  - The sun is the main source of energy for humans, plants and animals
  - A vast majority of our energy on Earth comes from the sun
- **2. Wind Power**
  - When the blades of a wind turbine spin, they convert wind energy to electrical energy
- **3. Water Power**
  - When the blades of a water turbine spin, they convert water energy to electrical energy

What are the different ways we can use renewable energy to generate electricity?

We can generate electricity using several different renewable energy resources.

Renewable energy means that it does not run out faster than we use it.

Types of renewable energy sources are wind, water, and solar energy.

Examples: Solar panels generate electricity to light streets.

Note :

- Hundreds of years ago, people needed machines to make their lives easier.
- In the past, people used wind and water mills to grind grains, but now they used wind and water turbines to generate electricity .

Activity (2): Windmills and Watermills

Watermills	Windmills
Advantages	Advantages
- Renewable energy resource. - Low cost - Use water	- Renewable energy resource. - Low cost -Use wind
Disadvantages	Disadvantages
Don't work when drought (dry)	Don't work without wind blow

Old and modern turbines :

Modern wind Turbines	Old windmills
	

The similarities:

Both have blades and depend on wind blowing

1. Advantages

*Get mechanical (kinetic) energy from air.
*Low cost.
* They are renewable resources of energy.

2. Disadvantages

Sometimes wind doesn't blow.

The differences:

Used for generating electricity	Used for crushing grains to make flour
* They don't have openings in their blades.	*They have openings in their blades.
* They have few blades.	*They have more blades.
*It converts kinetic (mechanical) energy to Electricity	*It generates kinetic energy to crush grains .

Modern water Turbines	Old watermills
*They use the energy of water movement.	*They use the energy of water movement.
* They generate electricity.	*They crush grains.
	

Activity (3): using energy from the sun

How is solar energy converted into types of energy we can use?

I-Important points on the solar energy:

The energy received from the sun is called solar energy. We can use it as a thermal energy

The rays that come from the sun (Sunlight) is called radiant energy or Radiation.

ELECTROMAGNETIC RADIATION
SOLAR RADIATION

Using energy from the sun
- A. Feel the warmth of the sun
- B. Greenhouses

Uses of solar energy:

A. Feel the warmth's of the sun's energy

The atmosphere, water, land and Earth's surface absorbed the sun's energy to increase their temperature.



C. heating water and cookingfood by using curved mirror, which direct sunlight to heat the water





B. Greenhouses

1. Built in the way enables the energy fromthe sun such as light and radiant to warm them.

2. Done by placing glass window on the wallsthat faces the sun for the longest time.

3. Convert radiant energy into heat energythat warms the inside of the greenhouse.

4. Help farmers grow crops that wouldnormally only grow in warm climates.

D. The solar heater



Heat the water as it passes through the pipes. By placing panels made of black pipeson the roofs of houses, we can store hot water (In tank) for use at another time.

1. Solar water	2. Solar panels are composed of many small solar cells)	
 Black pipes placed on the roof of houses to heat the water.		
is a device that **converts** ight or solar energy **thermal energy** **to heat water for bath and shower.**	It generates electricity by changing light energy (solar energy) **to** electric Energy	**Uses of solar panels:** **1- To light house and charge devices. as: calculator** (contains small solar cells) **2- To light streets.**

Note :

Greenhouses: **allow the entry of solar energy, then this radiant energy is converted into thermal energy that warms the greenhouses , which helps farmers to plant.**
Warming houses: **houses can be built in a way that enables energy of the sun to warm them by placing large windows.**
Cooking foods: **convergent mirrors are used to collect some rays to heat metal pots and cook the food.**

Activity 4: Have you seen solar panels in your community?

Small solar panels	Large solar panels
Work as one cell only	Work In set
Supply energy to power only one streetlight	Supply energy to whole buildings or towns

Solar panels: How its work

They are made of small solar cells that catch the radiant energy of the sunand turn it directly into electricity this called solar

Solar panels: The importance of solar panels

The electricity that generated from solar panels can use in

Stored in batteries

Such as Solar-cell calculators run on batteries powered by small solar cells



Turn on a streetlight

The electricity can be used immediately, such as to turn on a streetlight



Houses and Buildings

use electricity made from rooftop solar panels.



Power Irrigation equipment

solar power gives farmer the energy they need to run machines that waterhis plants twice a day.



How does the system convert the energy from the sun?

The solar panels use metal and plastic materials to capture the sunlight and convert the sun's energy toelectrical energy.

If the sun's energy is the input of the solar panel system,what is the output of the system?

The output of the solar panel system is

Lesson (3) : Using the energy of the wind:

Activity (5)

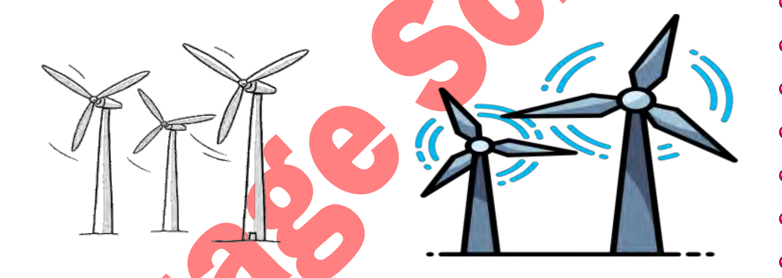
How wind turbines turn the **Kinetic energy** of wind into **electric energy?**

The sun is not the only renewable source of energy.

As the sun warms Earth, it warms the air.

Different parts of the world get different amounts of this **solar energy**, which causes the air to move and wind to blow.

We can use the energy in the wind to turn the blades of **Windmills**.



This kinetic energy can be used to generate electrical energy
Electrical energy is transmitted to the houses through **wires.**

The electricity from wind turbines is carried by big wires to places where it is needed.

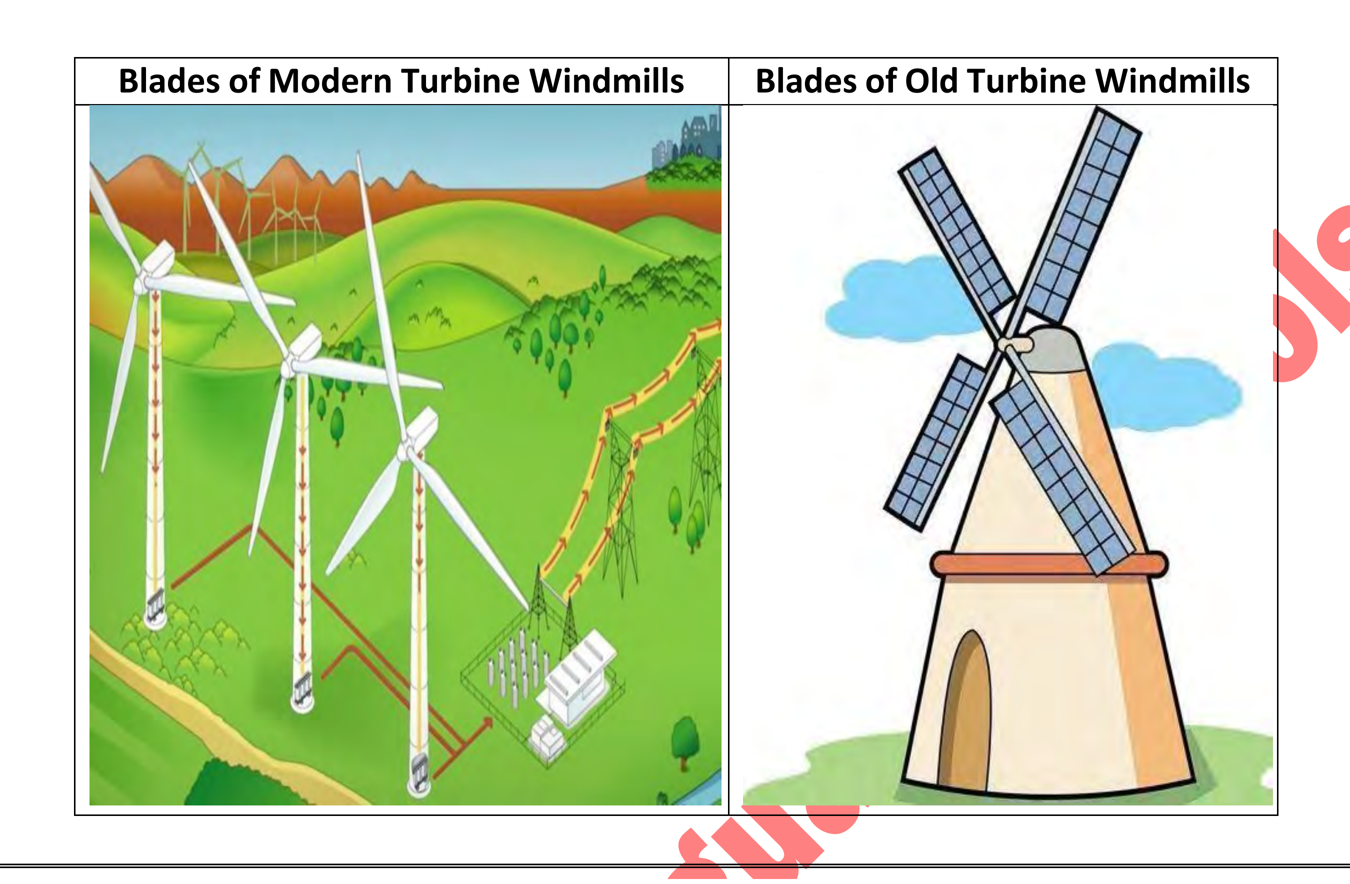


Draw the energy chain illustrates the inputs and outputs of wind turbine

Radiant Energy Sunlight (Mechanical)	Thermal Energy Warm and cool Air (Mechanical)	Kinetic Energy (Wind blow to turns Wind Turbine)	Electrical Energy

Activity 8: Work as engineers to design blades for a wind turbine.

Blades of Modern Turbine Windmills	Blades of Old Turbine Windmills



- ☐ *What are some of the differences you see between the two images? **size, shape, number of blades, and angle.***

- ☐ *How might the difference in the blades affect the generation of power? **All the differences may affect the speed of movement of the blades.***
- ☐ ***How did the shape of the blades affect the turbine? Some shapes were able to pick up the wind easier than others. Some shapes worked better with fewer blades***
- ☐ *What are the factors that affect the efficiency of energy transfer and transformation? **Size, shape, tilt toward or away from the wind, curvature of the blade.***

Lesson 4 :

Activity 9: **Falling Water:** Did you know water can also be used to generate electricity?

River runs downhill. As river runs, change gravitational potential energy to kinetic energy

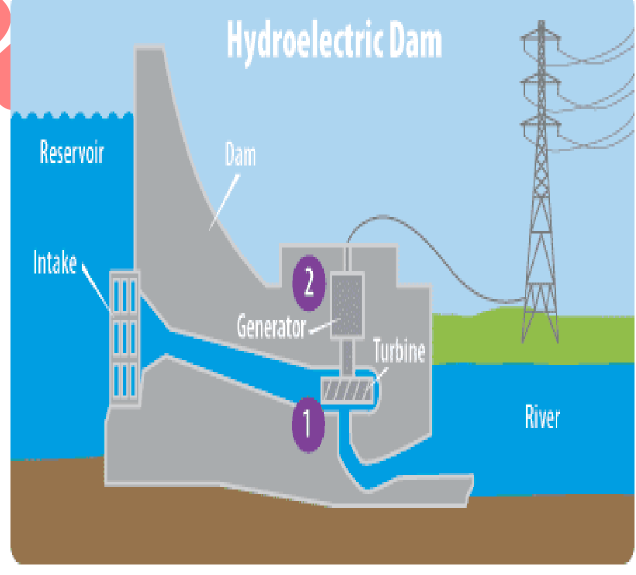
that help water turbines rotateto generate electricity

Dams are built on rivers to control the water flow and increase the potential energy of water.

The turbines and generators in the dam generate electricity. The electricity can be sentalong wires to cities where it is needed. This type of electricity is called Hydroelectricity







Water stored behind dam has Gravitational protentional energy	When water runs downhill through dam gravitational Potential energy changes into Kinetic energy	Flowing water turns a water turbine. A generator attached to the turbine changes kinetic energy to Electrical Energy

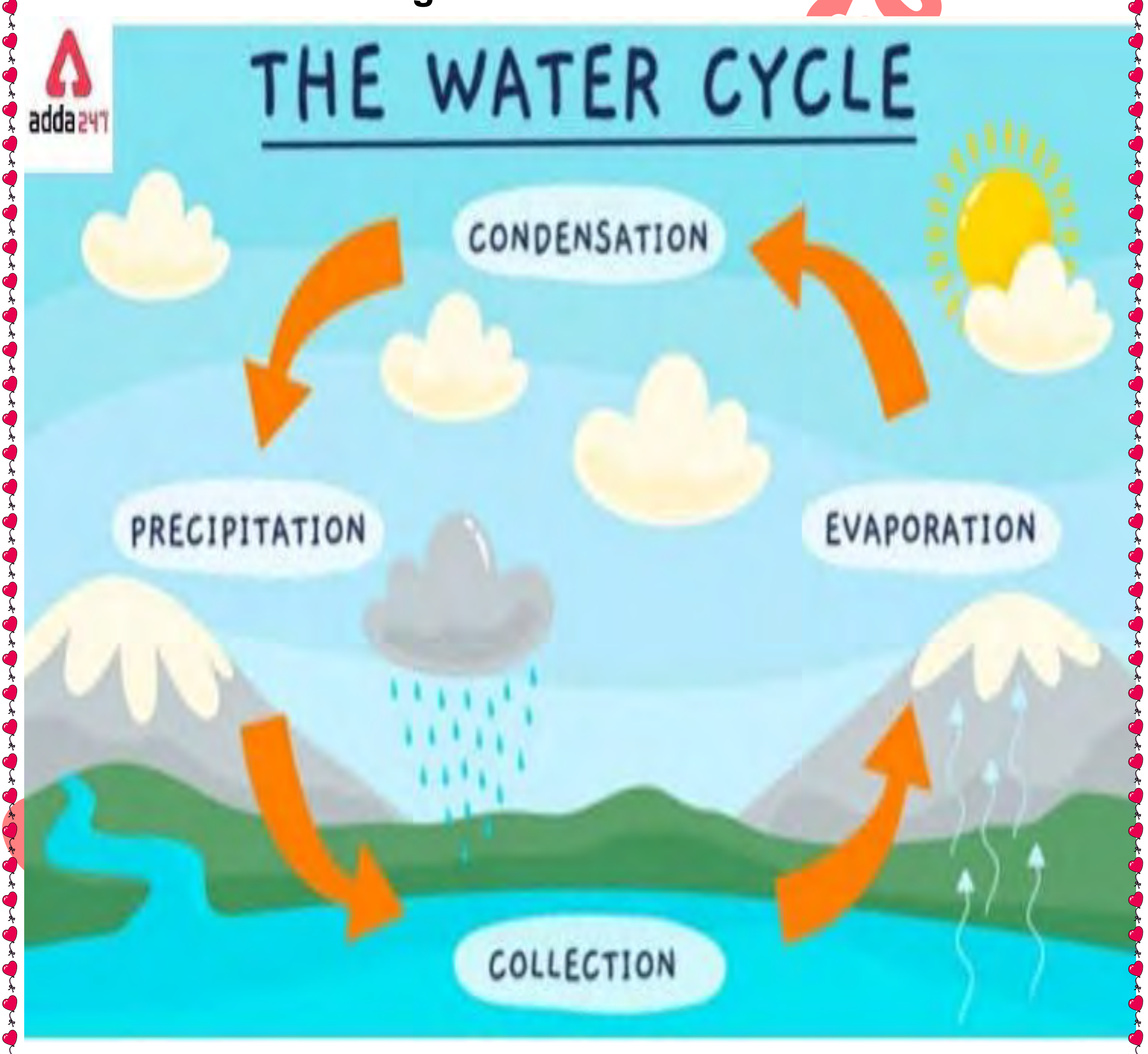
Lesson (5)

Activity (8):

Modeling a turbine Generator (wind and water turbines) (activity in the class)

Note :

In water cycle , water evaporates by the heat of the sun, then it condenses in a form of clouds and returns back in a form of rain falling .



Concept 4.1

Breaking Down and Moving Rocks

- **The factors change the earth's surface :**

- **Water**
- **Wind**
- **Weather changes**

➢ Natural Erosion:

-Water and wind are some of the factors that can transport small rocks from one place to another forming a **"erosion".**

Ex:

The disappearance of a part of sandcastle or all of it after few hours (**erosion of the sandcastle**), **due to the transportation of the sand particles from its place to another by the effect of water (sea waves) or wind forces.**



Notes:

- Water and wind are natural forces that are responsible for the erosion of sea coasts.
- Sand is formed by breaking down of rocks into smaller particles.
- The Earth's surface changes from time to time.



➢ Types of Earth's surface changes:

Fast changes	Slow changes
It may completely disappear in few minutes by the hitting of the sea waves. Such as : sand castle	There may be some little difference in its shape after many years if some parts break off. Such as: Coastal rocks
	

The similarities between the sandcastle and coastal rocks :

1. Both have steep needle-like parts.

2. Both have sloping sides at the bottom.

3. Water and wind create their shapes.

- **Canyons:**

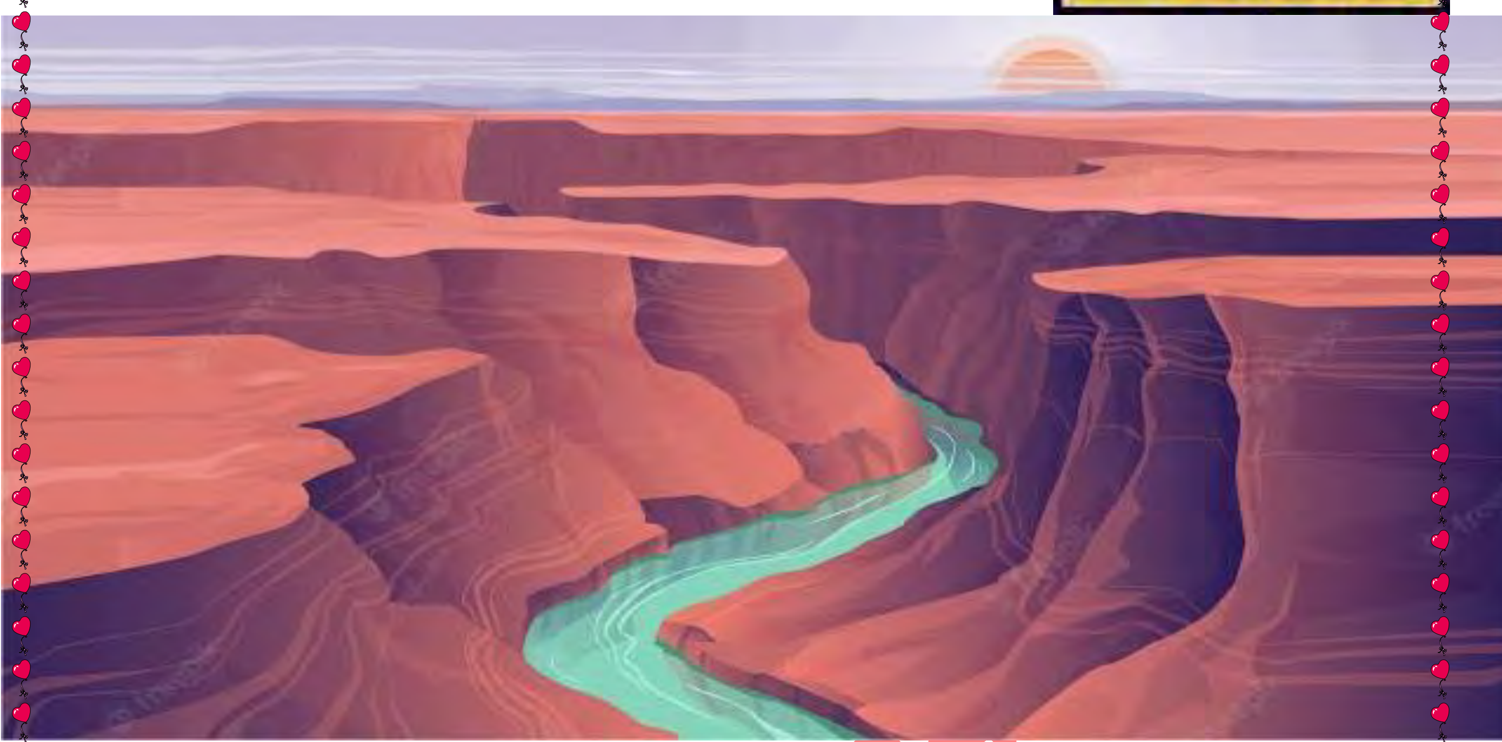
  They are deep valleys carved by flowing water.

- Canyons are formed due to the slow changes that happened to its rocks.
- The formation of canyons takes many years.
- A Canyon has needle-like parts and slopes at the sides because of the action of water.





Lesson (2)



- **Sediments** could be sand, rocks or soil, and this depends on the environment which the process takes place.
- The difference between Weather and weathering :

Weather	Weathering
✓ it's the condition of atmosphere at a specific time and place. ✓ There are many factors affecting weather such as temperature , wind, rains,….ect ✓ The conditions of weather can help us to decide what to wear when we go outside.	✓ It is the breaking down of rocks on Erath's surface into smaller (tiny) pieces. ✓ There are many factors that cause weathering such as wind and water. ✓ Weathering can change the shape of Earth's surface over time.



- **You can see the effect of weathering in many observations around you such as:**

-Breaking of statues.

- Removing of paints of buildings.

- Pulling a wave to the sand of seashores.

- Note: Colder climate and ice are another factors that can change the landscape.

- There are two types of weathering which are Chemical weathering and Mechanical weathering

- **A Mechanical weathering:** It is the breaking down of rocks due to the effect of wind, water, plant roots and temperature.
- The role of **wind** in mechanical weathering:
  1. Wind pushes the sand from a place to Another
  2. Friction occurs between sand and rocks so Rocks are broken down.
- The role of **water** in mechanical weathering :
  1. Water runs over rocks.

  2.Water dissolves some substances in rocks so Rocks are broken down.
- The role of **plant roots** in mechanical weathering:

1.Plant roots grow inside the cracks of rocks.

2.Crackse wider so rocks are broken down.

- The role of **temperature** in mechanical weathering :

1.Water flows into the tiny cracks of rocks When the temperature gets very cold, water Freezes forming ice that expands and makes
The cracks of rocks become wider.

2. When the temperature increases, the ice melts, so Water fills newly formed wide cracks again .
3. This cycle make rocks are broken down.

- Chemical weathering : Is the change of the structure of rocks due to chemical reactions.
- The role of oxygen in chemical weathering :

Oxygen of air reacts with iron of some rocks
Forming red-colored rust, this reaction can Weaken rocks and break them down easily.



- The role of water in chemical weathering :

When water dissolves minerals in a Rock, the dissolved minerals combine again forming new shapes as in Limestone caves.

- The role of acid rain in chemical weathering:

When the acid rain fall on rocks, it can dissolve minerals found in these rocks, causing the breakdown of rocks.

- The role of living organisms in chemical Weathering

Some tiny organism called "Lichens" produce acids on rocks that dissolve minerals found in these rocks and break them down.

Note :

lichens are tiny plants grow on the surface of rocks and produce acid



Lesson (3) :

Landform : is formed by breaking rocks into smaller pieces with different shapes of the same material. This process is similar to that happened to biscuits broken by hands (mechanical weathering) .

(4) Waterfall retreats upstream
Hard rock
(2) Overhang collapses
(5) Steep, gorge-like valleys
Soft rock
(3) Plungpool develops
(1) Undercutting

- landform is formed mechanically weathered over time.



Lesson (4)

Erosion : It is the process in which the small particles of sand, soil and rocks are moved to other places by wind, water and gravity.

- The small particles of sand, soil and rocks are called Sediments

❖ **Action of wind erosion :**

A gentle wind	A stronger wind
It may carry sand grains for a short distance (about 1 meter)	Like hurricanes carry them for a longer distance.

❖ **Action of water erosion:**

-Rivers and floods carry sand, soil and rocks downstream.

-Sea waves pull sand away from beaches.

-Rain washes away the soil of farms that locate beside downhill.

❖ **Action of gravity erosion:**

The broken weathered rocks in a mountain can be pulled down at mountainsides by the effect of gravity.

➢ **Formation of sedimentary rocks:** Sediments are mixed with mud and remains of plants and animals at the bottom of oceans, lakes and in deserts forming layers.

➢ **After erosion**, the deposition process Is the next stage that shows where pieces of rocks might end up.

-When the wind blows, it picks up sand into the air

-As the wind moves, the sand may travel with it to a new place.

-When the wind stops blowing, the sand falls onto the ground and deposites .

➢ **Deposition**: It is the process of laying down of sediments after its erosion.

➢ **Action of water in deposition:**



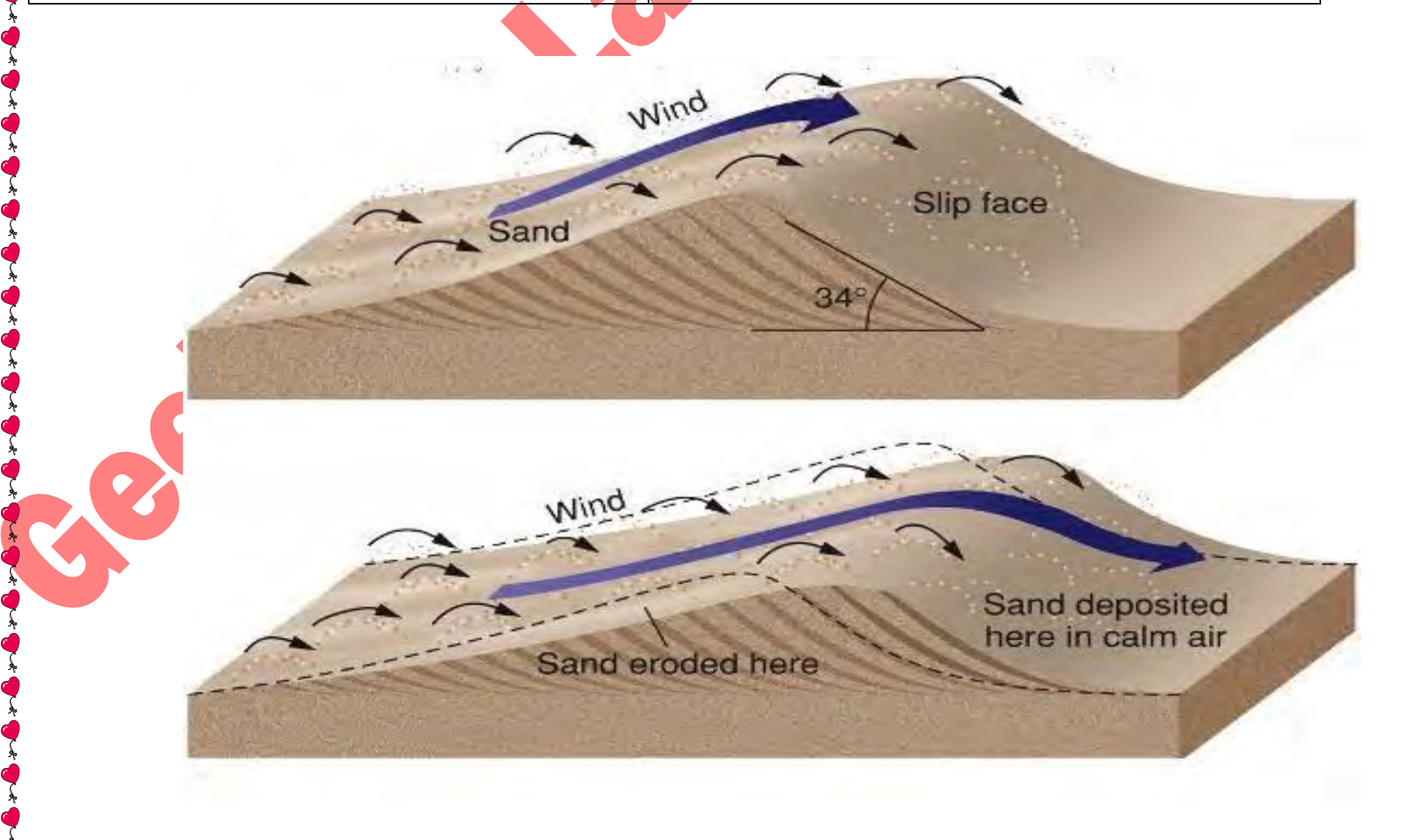
Running water in rivers play an important role in deposition process such as :

- A river can deposit a sandbar along its banks (sides) .
- When a river carries sediments meet a sea, these sediments are deposited there forming a delta such as the Nile Delta.
- **Delta :**

  it is a fan shaped (triangle-shaped) mass of mud and other sediments that forms where a river enters a large body of water.

  - **Action of wind deposition :**

Weak winds	Strong winds
They can form small sand dunes like Sand dunes on a beach.	-They can form large sand dunes like Sand dunes In Western Desert in Egypt. Rub' Al Khali in the Arabian Peninsula



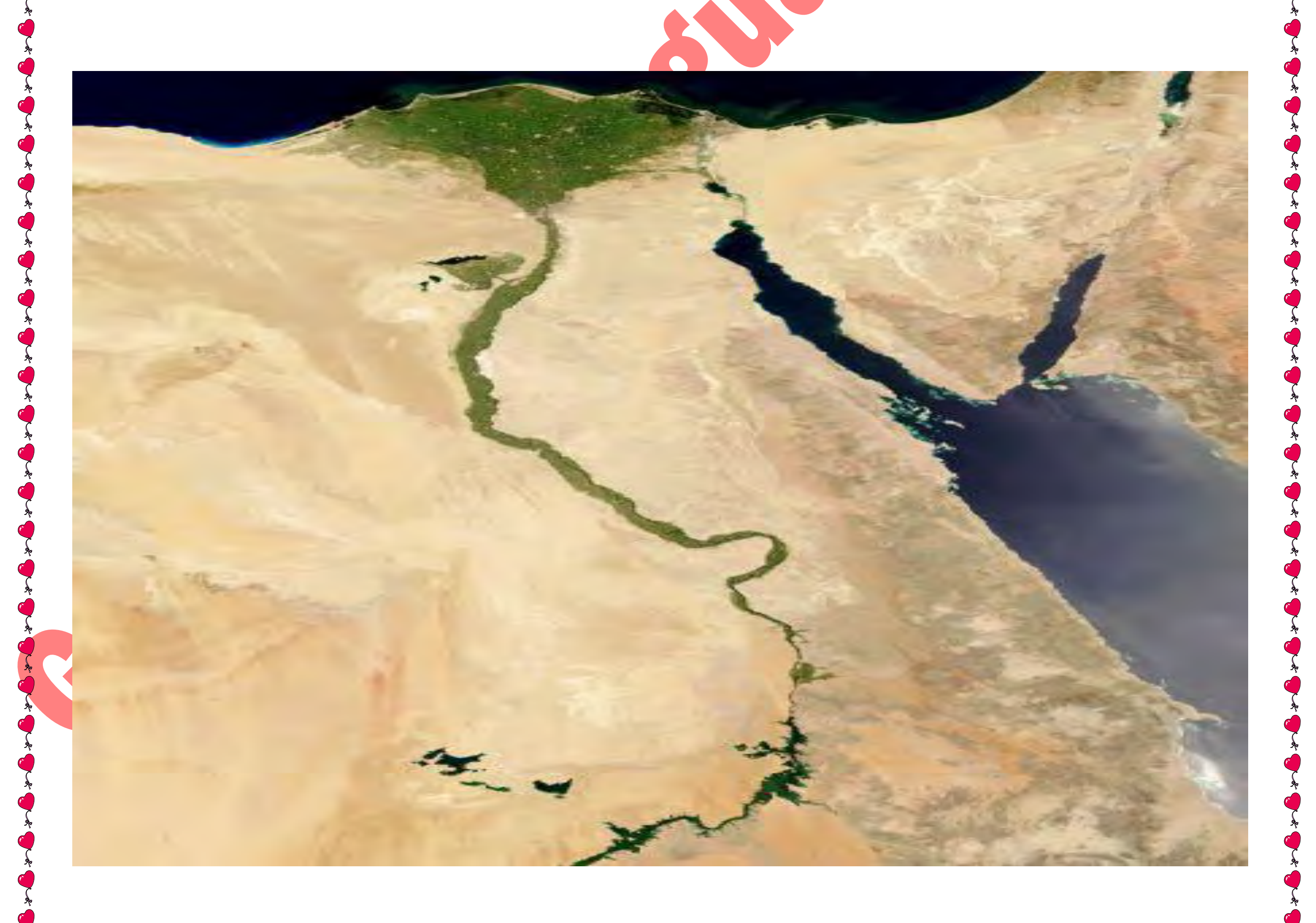
Lesson (5)

➢ By the action of these processes (weathering , erosion , deposition) in order, we can observe changes in the Earth's surface such as:

-Sand dunes: which are small hills of sand found in a desert or on top of a beach.

- Delta: which is a piece of land shaped like a triangle that is formed when a river enters a large body of water such as a sea or an ocean.

- Deposition: it is the process of laying down of sediment after its erosion.



Concept 4.2
Lesson (1)

How are canyons formed?

A Canyon can be formed in many ways, such as weathering and erosion due to wind, water and other f



Canyons differ in their colors, texture and shape of rocks, where:

- Wadi Nakhr canyon in Oman its color is brown and black but the Small Canyon in:
  Thailand has a reddish color.

Canyons can have V-shape as in colored canyons in Sinai and Wadi Rum canyon in Jordan.

Canyon formation:



At the beginning of its formation by the effect of a stream of water, which can be observed from

The following evidence:

-Trees and other plants that are growing on both sides of canyon, need water to grow.

-The sides are gently sloped due to the help of water in wearing (eroding) the sides down.

Notes

Water streams that flow over flat land will probably form small canyons. The small canyon shown above could get deeper if it rained a lot, and water ran through it again.

Other forms of landforms such as:

Mountain -Dunes-Valley

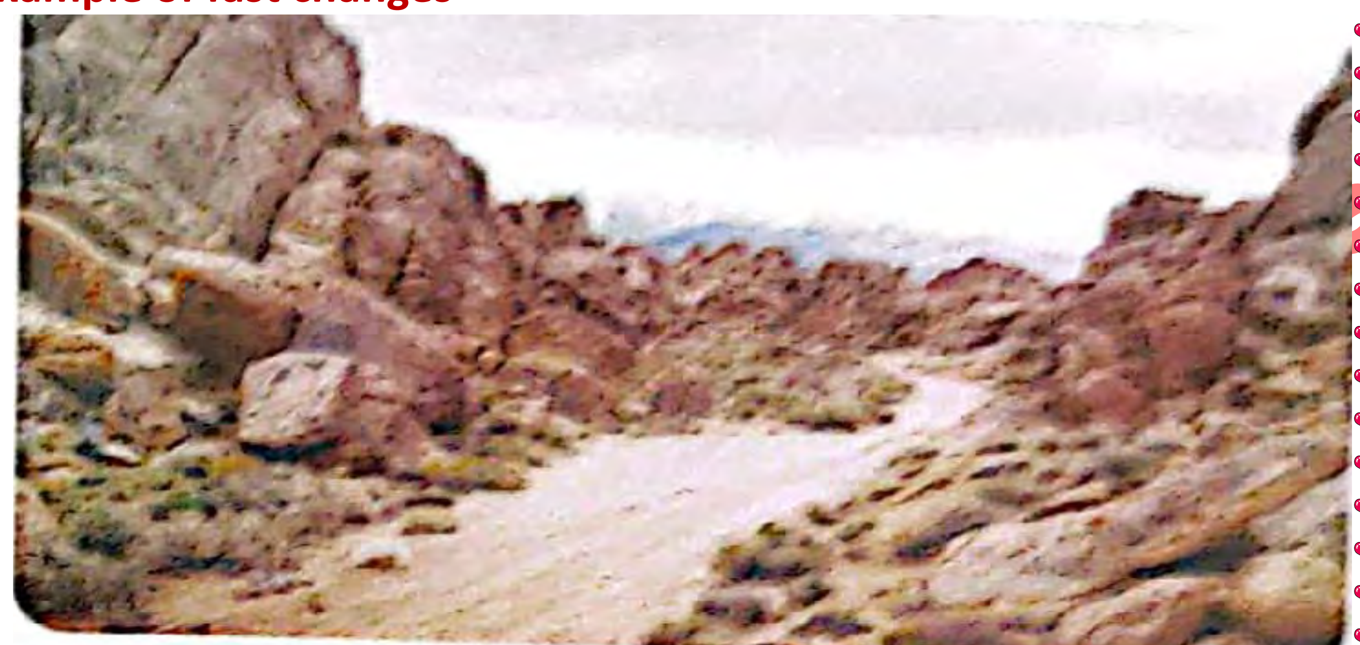
Give reason for:

It might be useful to recognize signs of weathering , erosion and deposition.

Because it may help in building houses in safe places.

Lesson (2)

Example of fast changes



In the picture mudslide that represents a very quickly change in their landscape due to flooding rain

Examples of slow changes:

The picture shows a change in the landscape that contain a river and mountains.



How was this landform created?

When the river has worn away the Rock between mountains then wind and weather erosion could be breaking down the sides of the mountains.

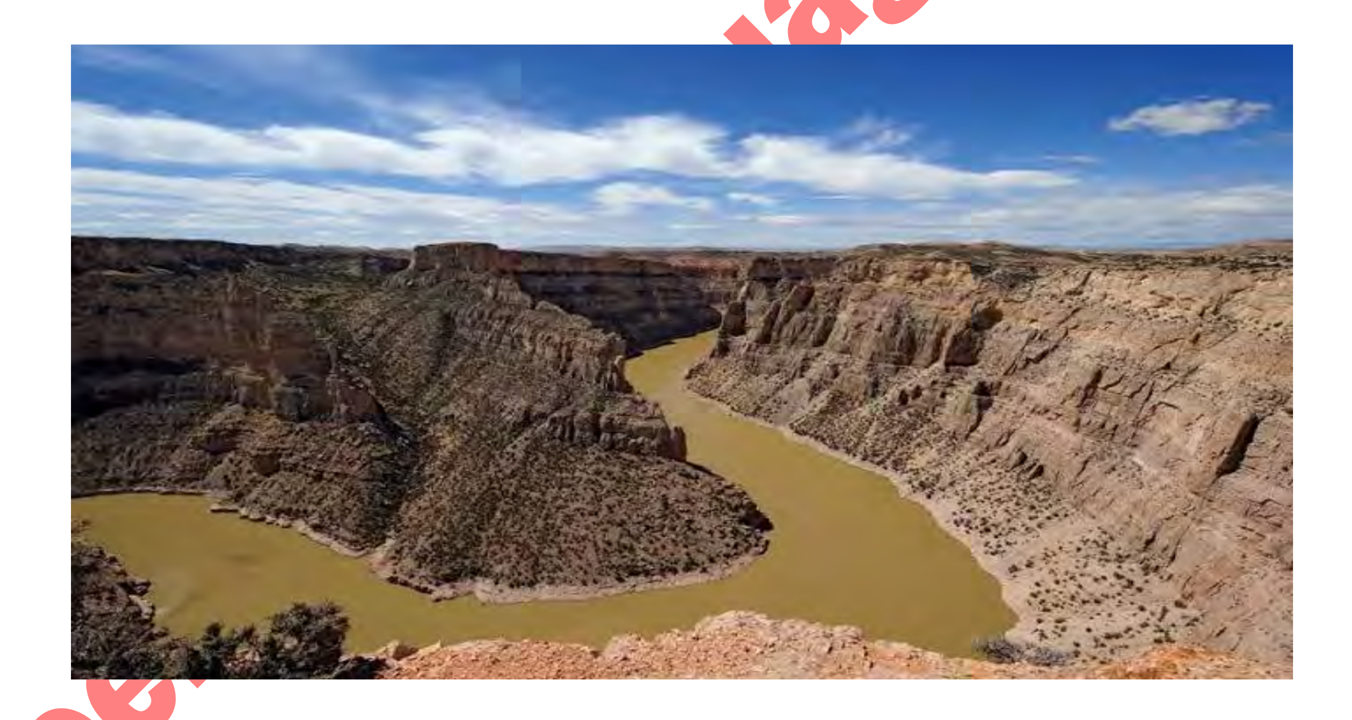
They are two changes me happened to this landform which are:

1-The river may get wider and the curves get bigger

2- The river may dry up leaving a small canyon between mountains.

Canyon are special types of valleys that have steep sides

1. Gravity pull rainwater downhill forming small streams
2. These small stream join together forming a bigger stream (river)
3. The water of the river flows fast across the land and erodes a pathway
   through the landscape that makes the river carve out a valley.



Grand Canyon:

It is located in United States of America

It is very large and steep canyon, and it contains many layers of rock.

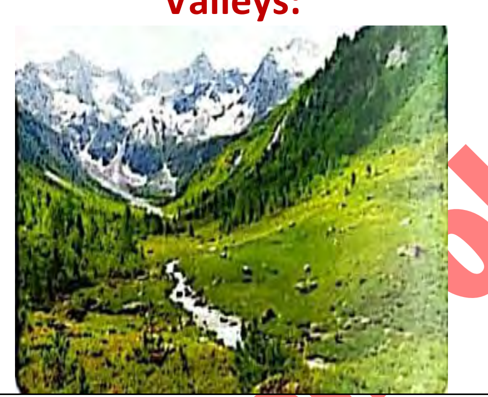


Formation of the Grand Canyon:

1. **Over long period of time (millions of years) the water of the river there**
2. **flowed so quickly due to travelling of river down a steep slope**
3. **The water of the river eroded the rock and cut them deeply**
4. **The fast flow of water eroded a lot of sediment and carry them away that leads to the formation of the Grand Canyon**

Lesson (3)

Canyons and Valleys

Canyons:	Valleys:
	
They are wet eroded areas in the mountains -their walls are very high (with great depth), steep, narrow, and consist of many layers of rocks	They are lowland areas in between mountains, with gently sloped sides that surround a wide flat plain.

Similarities: both of them can be formed by rivers or streams , have rivers or streams flow through the lowest points.

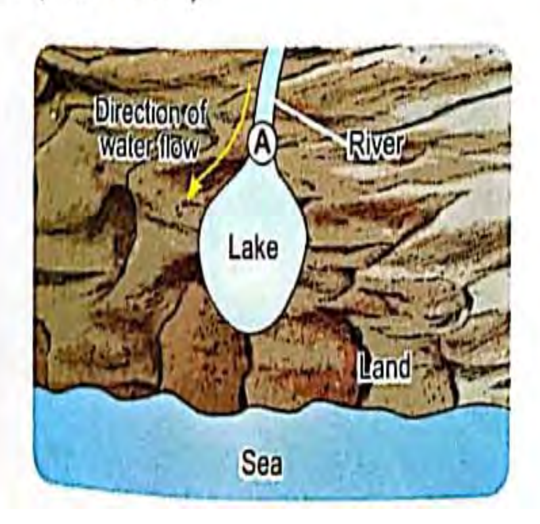
Delta formation



1. Streams or rivers which flow fast carry sediments which called silt
2. The river water flows and carries more sediments until the river water becomes full of sediments
3. When the speed of the river water decreases, it drops the sediments (silt) which carrying forming deltas

Note: **Silt is made of very fine bits of sand, clay or rock materials**

A delta can be formed at area (A) as the river (fast flowing water) enters the lake (still water).



A delta can be formed at area (B) as the river (fast flowing water) enters the ocean (slower flowing water).



Note:

1. Large wetlands are formed in deltas.

2. Plants that grow in the wetland found in deltas increase deposition process because:

- **Plants are partly responsible for slowing down the river water**
- **Roots of plants help in trapping sediments**

The Nile river delta:

It is the most famous deltas in the world.

The Nile River Delta has a triangular shape and it lies between Cairo and the northern coast of Egypt.

It was formed in Egypt as a result of the rapid flow of the Nile River, which travels a distance of about 6,600 kilometers to pour into the Mediterranean Sea.

It covers over 20,000 square km in Egypt, and it is characterized by the presence of fertile soil that allows the cultivation (planting) of different types of crops.

Lesson (4)

Wind erosion

It is the process of carving the rock into different shapes by wind blowing.



Steps of wind erosion:

1- When wind blows, it picks up sand and rock particles and carries them along.

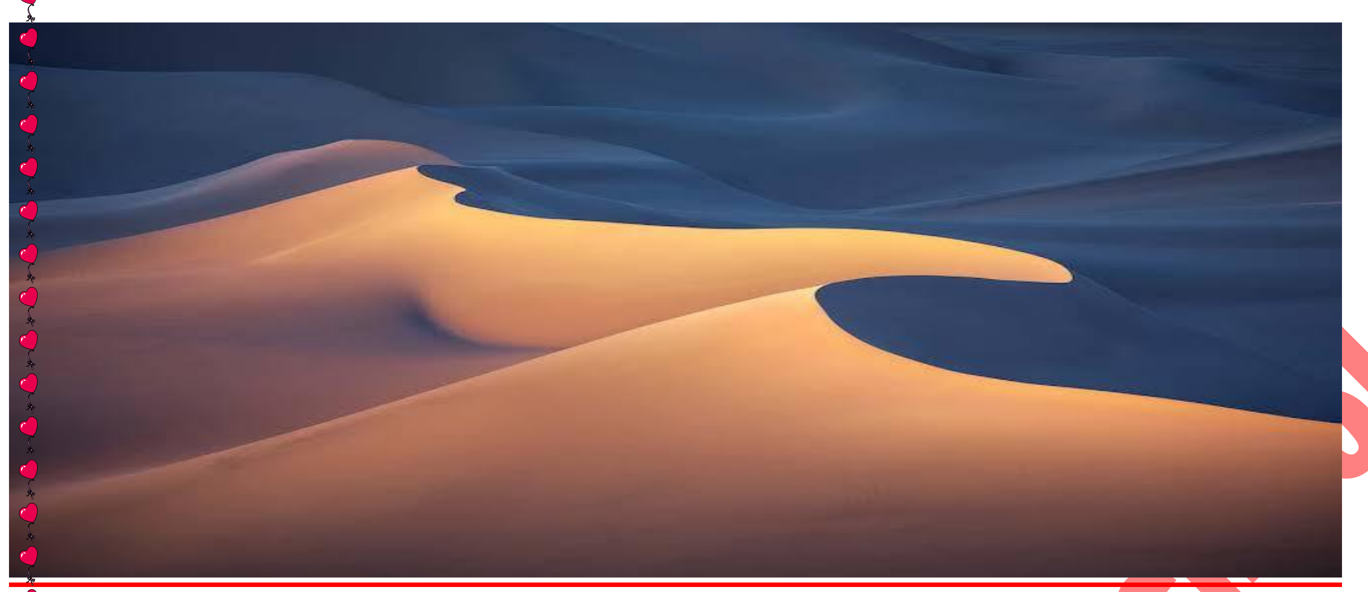
2--When this flying sediment hits a rock , it wears down that rock-

3- Wind erosion carves the rocks into different shapes -

Erosion and deposition processes at the same time create sand dunes

Sand dunes:

It is the landform that is formed by erosion and deposition of sand in sandy desert environment



*Sand dunes are common landforms between beach and sandy desert

*Sand dunes ***depends on both force and direction***

Sand dunes movement:

-When wind blow across a dune erode away from the side that wind is coming from.

-The sand grains carried by wind are collected along the slope of dune.

-When the sand reach to the top, the dune forms a barrier to the wind and sand grains roll down the other side

Generally, water and wind can change landscape over time

Such as (canyons, mountains, dunes …….etc.)

Sand shifters:

1-The wind moves the sand, where:

a-The distance traveled depends on the force of the wind.

b-The way that sand moves depends on the direction of the wind

2-The dunes are formed when the sand path is blocked like rocks blocking its path.

Lesson (5)

The landscapes change over time, where:

Sediments:

When rocks are weathered, tiny pieces that break down and float away.

-The layers of sediments may hold fossils that existed there in the past.

Geologists: are scientists who study rocks.

-Geologists call each separated rock layer a formation.

Gr: Geologists study the layers of sediments in rock formations?

-To know how the landscapes looked like in the past

Formation of rock layers of Wadi Al-Hitan:

Found in: Fayoum in the western desert of Egypt.

-It changes over time as follows:

1- When rocks were weathered, sediments are floated away.

2- Sediments build up in layers at the bottom of a sea

Note: all of northern Egypt was a sea from 40 million year ago

3-As the sea moved out, the layers of sediments formed sedimentary rocks Such as limestone and sandstone

Arrangement of rock layers in wadi al-hitan:

-**The top layers** contain newest rocks

-**The bottom layers** contain oldest rocks that contain sedimentary rocks contain fossils tell us the deep of the sea



Some fossils of Wadi Al - Hitan :

-Skeleton of crocodile, whales, sea cows and turtle

-Shark teeth

Describing landforms:

Canyons and valleys are formed due to erosion by water and wind -

Deltas:

Are fan-shaped (triangular shape) landforms.

They are formed due to deposition process when river enter lakes, seas or oceans-

Sand dunes are formed due to erosion -

Deposition process caused by wind-

Note: in general erosion happens slowly, but can happen quickly during storm or rockslide

Geel 2000 Language Schools

Science Department

Primary (4)

Worksheets

with

models answers



Second term

(2023– 2024)



Name: --

Class: --

Worksheet (1)

- **Choose the correct answer:**

1. Toy cars need energy to do all the following functions, except...........
a. moving forward and backward. b. rotation in a circle
c. moving right and left. d. rotation around the moon.

2. In the battery of a toy car .... energy changes into electrical energy
a. chemical b. sound c. light d. thermal

3. Electrical energy produced from a toy car battery can be changed into ....and .... energies.
a. mechanical - sound – solar b. mechanical - thermal - solar
C. mechanical - sound – thermal d. sound - thermal - solar

4. The energy source in a toy car is the ....
a. engine. b. tires. c. battery. d. fuel

5. It takes several........... for a spacecraft to travel from Earth to Mars.
a. months b. seconds c. minutes d. days

6. Curiosity rover is designed to explore.
a. the moon. b. the Sun. c. Earth planet. d. Mars planet.

- **Correct the underlined words:**

1. The solar energy produced from the moon can be converted into different forms of energy. (.........................)
2. Toy cars depend on fuel as a source of electrical energy. (.........................)
3. Curiosity is a robotic vehicle that is designed to explore the surface of moon. (..............................)

- **Complete the following sentences :**

1. The energy can be .... From one form to another.
2. Remote controlled toy cars changes..................energy stored in its batteries into........... energy that in turn changes into.................. energy which is used to Move the car.
3. To operate an electric mixer we use ....Energy.
4. When your cell phone is out of charge, you must rechange its..............To operate it again.
5. Some calculators can change solar energy into......................Energy by using the Sunlight.

- **Put (✓) or (x) :**

1. Energy cannot be transformed from one form to another. ( )
2. We can convert the solar energy into different forms of energy. ( )
3. We can continue to move a toy car even after its battery runs out. ( )
4. Curiosity is a vehicle that travels across the surface of the planet Mars. ( )
5. Mars is located a few meters away from Earth. ( )
6. Without electrical energy, Mars rover curiosity cannot move or communicate With Earth. ( )

- **Give reasons for:**

1. Some calculators use the sunlight to be operated.
   ....
   ....
2. A remote controlled toy car needs battery to move from one place to another.
   ....
   ....

Worksheet (2)

- **Write the scientific term for each of the following:**

1. The main source of energy for most forms of energies on Earth.(……………………….)
2. The energy produced when the wood of trees is burned. (……………………….)
3. It is produced from the remains of dead trees buried under the Earth's surface over millions of years. (……………………….)
4. The energy that is used to operate an electric heater. (………………………….)
5. The energy stored inside the coal. (……………………….)

- **Complete the following sentences by using the words from brackets:**
  (electrical – kinetic -sun – light – thermal – kinetic – potential – sound – heat – kinetic – thermal)

1.The energy that is produced from the battery used to operate a toy car is …………..

2. When you press on the soap dispenser, you turn the ………….. energy stored in its spring into…………. energy that moves the soap upward.
3. The energies that are produced from the washing machine are…………… energy and …….. energy.
4. When you rub your hands together, the ………….. energy is converted into…………energy.
5. In any energy chain, some of the energy is lost in the form of………….
6. The electric lamp converts electrical energy into . ... energy and …. ……… energy.
7.The……………… is the primary source of energy that is transferred to the food in the
Form of chemical energy.

- **What happens if…?**

1) You burn a piece of wood. (according to the change of energy).

   ………………………………………………………………………………………….

   ………………………………………………………………………………………

2) You shake a small bell with your hand. (according to the change of energy).

   ………………………………………………………………………………………….

   ……………………………………………………………………………………………

- **Put (✓) or (x):**

1. In the soap dispenser, potential energy changes into kinetic energy. ( )

2. In the electric blender, sound energy changes into electrical energy and kinetic energy. ( )

3. Most of energy chains starts with the moon. ( )

4. Light energy from the Sun causes trees to grow. ( )

5. Both hair dryer and washing machine depend on the same kind of energy to be operated. ( )

6. In the electric power stations, the sound energy produced from burning of coal can be changed into electrical energy. ( )

7. There is energy loss when energy is transformed from one form to another. ( )

8. Energy can be destroyed inside some devices. ( )

9. Electric bulb depends on chemical energy to be operated. ( )

10. Both electric bulb and electric heater produce thermal energy. ( )

Worksheet (3)

- **Write the scientific term for each of the following:**

1. The energy produced from playing guitar. (…………………………….)
2. The energy produced from the electric lamp and affects our eyes. (………………………………….)
3. The energy used to play a drum. (……………………………….)

- **Choose the correct answer:**

1. In the electric water kettle, the electrical energy changes into............... energy that can warm the cold water inside it.
   a. sound. b. thermal. c. light d. kinetic.
2. Some kinetic energy is converted into………….energy due to friction of bike's tire With the road.
   a. light b. electrical c. potential. d. thermal
3. Both hair dryer and electric water kettle produce………….. energy
   a. Chemical b. thermal C. light d. potential
4. When you turn on a light bulb, the electrical energy travels through. ....until reaching the bulb.
   a. wires. b. glass c.wood d.plastic.

- **Complete the following sentences:**

1. When you ride a bicycle, the …………….energy stored in your body is converted into……………. Energy which causes the bicycle to move.

2. The electric lamp converts.............. energy into light energy and.................energy.

3.The change of electrical energy into sound energy in the radio is an example that proves the law of …………………..

- **Give reasons for**

  1.You feel heat, when you put your hands near a lighted electric lamp.

  ……………………………………………………………………………………………………

  ……………………………………………………………………………………………………

  2- The presence of batteries inside a toy car.

  ……………………………… ………………………………………………………………

  ……………………………………………………………………………………………

- **What happens if……?**

  - You put your hands near the lighted lamp .

  ……………………………………………………………………………………………………

  ……………………………………………………………………………………………………

Worksheet (4)

- **Put (✓) or (x) :**

1. The produced sound energy helps the hair dryer to do its function. ( )
2. In waterfalls, the water that falls down has a kinetic energy.( )
3. The input energy in a hair dryer is the chemical energy. ( )
4. The energy chain of a burning candle is :Chemical energy converted into Thermal energy. ( )

- **Write the scientific term:**

1. The wasted energy when using a mobile phone for a long time. (……………………)
2. A kind of energy that is produced from the electric heater and burning coal. (………………………)
3. The energy that is produced from the blender and helps it in doing its job. (…………………………)
4. The energy that is produced from the electric power stations and flows through wires. (…………………………)

- **Choose the correct answer:**

1. The input energy when using the hair dryer is the ………… Energy.

a. electrical   b. potential   c. kinetic   d.thermal

2. During the running of a player, the chemical energy inside his body is converted Into ……….. and…………energies.

A. potential-light.   B. kinetic- light.   C . thermal- kinetic.   D. thermal – light

3. The output energy when playing drums is the ……….. energy.
   a. chemical   b. light   C. sound.   d. potential
4. When a piece of coal is burnt,…………………… Energy is produced.

a.Thermal   b. Kinetic   c. Sound   d. Potential

- **What happens if… ?**

1- You turn on an electric fan. (according to the change of energy).

……………………………………………………………………………………………………
……………………………………………………………………………………………………

2- use a mobile phone for a long time. (according to the wasted energy).

……………………………………………………………………………………………………
……………………………………………………………………………………………………

- **Give reasons for:**

- Thermal energy in mobile phone is considered as a wasted energy.

……………………………………………………………………………………………………
……………………………………………………………………………………………………

- Sound energy and thermal energy are considered as wasted energy in the blender.

……………………………………………………………………………………………………
……………………………………………………………………………………………………

<u>**Worksheet (5)**</u>

- **Correct the underlined words :**

5. Fuel is the substance that produces <u>electrical energy o</u>n burning.
   (……………………….)
6. We need <u>sound energy,</u> for cooking foods and warming houses.
   (………………………..)

- **Put (✓) or (x) :**

5. Both coal and wood produce energy on burning them. (   )
6. You need gasoline to move a bicycle.   (   )
7. We cannot drive a car that doesn't contain fuel . (   )
8. As the speed of the car increases, the amount of used fuel decreases. (   )

- **Choose the correct answer:**

1- We can use the energy obtained from burning of wood in all of the following situations, <u>except</u> ……………

a. warming houses.   b. operating television.   C. cooking food
d. boiling water.

2- All the following are found deeply under the Earth's surface, <u>except</u>…………….

a. Natural gas.   b. Coal.   c.Green plants.   d.Oil

3- Among forms of fuel that present in car fuel stations are………..

A. Gasoline and wood.   B. natural gas and coal.

C. wood and coal.   D. gasoline and natural gas.

- **Complete the following sentences :**

1) Gasoline burns inside a car engine to produce………………. energy that is changed Into…………………energy which causes the movement of the car.
2) We can use some forms of fuel such as………….and……………in warming houses.

- **Give reasons for:**

- fuel is very important for different means of transportation

………

………

-Sometimes the fuel indicator of a car goes down.

………

………

-Gasoline burns inside a car engine.

………

………

Worksheet (6)

- **Choose the correct answer**

1. All the following are forms of fuel, <u>except</u>………………

   A. wood.   b. natural gas.   C. gasoline.   d. glass.

2. All the following are renewable resources of energy, except………

a. natural gas   b. water.   C. the Sun.   d wind.

3.Coal is formed under the Earth's surface……….. from the remains of

A. dead animals.   b. dead plants.   C. dead humans.   d. dead insects.

4.Wood is considered as………..

a. biofuel.   b. fossil fuel.   C. liquid fuel.   d.gaseous fuel.

5.Extreme heat and pressure under the Earth's surface has an important role in Forming.

a. wood.   b. wind.   C. Fossil fuel.   d.biofuel

- **Complete the following sentences**

1. Water and………………are considered from…………. resources of energy, while Coal and……..,………..are from non-renewable resources of energy.
2. Wood chips and grass can be used to make a ………………… biofuel .
3. Different forms of fuel can be classified into two main types which are ....and..............
4. The natural resources that are consumed at a rate faster than they can be Renewed are called……………. ……….Resources of energy.

- **Correct the underlined words:**

1. We have to increase planting vegetables and fruits that need a large amount of water.(……………………….)
2. The moon is the primary source of both biofuel and fossil fuel.(…………………………..)
3. We can use some animals, to make a liquid biofuel. (…………………………..)
4. The rate of consumption of fossil fuel, must be increased. (…………………………….)
5. Wood is a form of fossil fuel, that can be used in houses. (…………………………….)

- **Put (✓) or (X) :**

1. Biofuel is one of non-renewable resources of energy. ( )
2. Extreme cooling under the Earth's surface, helps in the formation of oil . ( )
3. The Sun is the primary source of forming both biofuel and fossil fuel. ( )
4. We have to reduce the usage of the Sun as a source of energy. ( )
5. We can make a liquid fuel from grass and wood chips. ( )

- **Read the following paragraph, then choose the correct answer :**

Nowadays , we use gasoline and natural gas in means of transportation which are
considered fossil fuels, while we can use coal which is a fossil fuel and also wood
which is a biofuel in warming our houses.

1.…………………is a non-renewable resource of energy, that is considered as a fossil fuel
And it is not used in means of transportation nowadays.

A. Water. B. Coal C. Wind d. Gasoline

2. A type of biofuel, which is used in warming houses and cooking food is ………….

a. wood b. wind. C. water. d. sand.

3. A type of fossil fuel, which is formed from decomposition of plant remains is ....

A. wood b. sand. C. wind. d. coal.

Worksheet (7)

- **Put (✓) or (X) :**

1. We have to conserve all forms of fuel. ( )
2. Burning of fossil fuel inside electric power station produces Potential energy. ( )
3. Turning off lights that we do not need, is a way to conserve electricity. ( )
4. Any form of fossil fuel must be formed under the Earth's surface. ( )

- **Arrange the following steps to show how electricity is generated in electric Power station and sending it to houses and factories:**

(..........)Steam turns turbines that produce kinetic energy.
(..........)Fuel burns and produces thermal energy.
(..........)Electrical energy sent to houses and factories.
(..........)Water becomes hot and produces steam.
(..........)Turbines turn generator that produces electrical energy.

- **Write the scientific term:**

1-The matter that produces steam on heating, which is used to turn turbines in Electric power station. (.............................)
2-The type of fuel that is used inside the electric power station to produce Electricity . (...........................)
3-The device in the electric power station, that produces kinetic energy to operate Generators. (.............................)

- **Correct the underlined words:**

1. Fossil fuel include oil, coal and <u>wood</u>. (.........................)
2. Hydroelectric energy, is one of <u>non-renewable</u> energy resources. (...........................)
3. In electric power station, <u>water</u> turns turbines that produce kinetic energy. (...............................)

4. After death of living organisms, their remains are buried under the Earth's surface and exposed to
5. extreme pressure and cool.(………………………….)

- **Choose the correct answer:**

1. Inside the electric power station, heating of ……….. produces steam.
   A. turbines b. generators C. water d. fuel
2. All the following are used to generate electrical energy, except……….
   A. Oil .B. natural gas. C. waterfalls. D. rain water.

3.Hydroelectric energy is generated from. ……………
a. waterfalls only. B. waterfalls and dams.
C. biofuel only. d. biofuel and fossil fuel.

4. All the following are forms of fossil fuel, except …………..
a. water. b. coal. C. natural gas. d. oil.

5.Which of the following forms of fuels can be manufactured by man?
A. Oil and natural gas. b. Oil and charcoal.
C. Natural gas and ethanol. d. Charcoal and ethanol.

6.All the following factors play an important role in the formation of fossil fuel, except …………….
A. extreme pressure. b. extreme heat.
C. The moon light. d. rocks and sediment.

Worksheet (8)

- **Choose the correct answer :**

1.Cars smog cause irritation of……… of humans.

a. stomach and eyes   b. eyes and lungs   c. small intestine
d. large intestine

2. Acid rain is formed when………..Combines with rain water.
A. oxygen gas   b. carbon dioxide gas   C. dust
d. sand

3. All the following are harmful effects of acid rain, except.
a. global warming.   b. death of trees.
c. chemical changes in lakes.   d. chemical changes in the soil.

- **Complete the following sentences by using the words :**
(Acid - Fish - soil - carbon dioxide – smog)

1. Acid rain leads to chemical changes in the structure of lakes causing death of ………………..
2. Burning of coal and oil produce …………………… gas .
3. Chemical changes in the structure of…………………Due to………….Rain .
4. Tiny particles found in …………………lead to air pollution .

- **Put (✓) or (X):**

1.Acid rain helps trees to survive. ( )

2. Global warming increases the decomposition of some rocks . ( )

3. Rain water can be mixed with both pesticides and carbon dioxide gas. ( )

- **Write the scientific term of each of the following:**

1. It is the system that its tissue is damaged due to breathing big amount of cars smog. (………………………)
2. It is a phenomenon in which the Earth's temperature increases when carbon dioxide gas increases in the air. (……………………………)
3.

Worksheet (9)

- **Give one example for each of the following :**

1. A method of conserving fossil fuel.
   ……………………………………………………………………………………………
2. Anon-renewable resource of energy.
   ……………………………………………………………………………………………
3. An advantage of using renewable resources to produce energy.
   ……………………………………………………………………………………………

- **Correct the underlined words:**

1. The amounts of <u>renewable resources</u> of energy are limited on Earth. (……………………)
2. Gases emitted from fossil fuel on burning <u>decrease</u> the temperature on Earth. (…………………)
3. Gases emitted from burning fossil fuel always <u>clear</u> the air. (………………………)

- **Give reasons for:**

1. To keep the air clean we must replace fossil fuel with renewable resources of Energy
   ……………………………………………………………………………………………
   ……………………………………………………………………………………………

- What happens if .. ?

1. Using renewable resources of energy instead of fossil fuel. (according to Earth's temperature)
   ……………………………………………………………………………………………
   ……………………………………………………………………………………………
2. People don't rationalize their using of fossil fuel.
   ……………………………………………………………………………………………
   ……………………………………………………………………………………………

Worksheet (10)

- **Choose the correct answer:**

1.All of the following are examples of renewable energy resources, except ………………

a. fossil fuel. b. waterfalls. C. wind. d. sunlight.

2. Gasoline is a non-renewable energy resource that is used inside a …………………

a. flashlight b. car engine C. electric fan d. Washing machine.

3. Some types of lamps depend on……………. ……as a renewable energy resource in order to do its function .

a. sunlight b. oil. C. coal d. natural gas

- **Correct the underlined words :**

1. Solar panels use sound energy to generate electricity. (…………………….)
2. the high cost of producing energy in windmills is one of its advantages. (…………………)
3. Manual mixer depends on electricity to do its function. (…………..…………….)

- Put (✓) or (X):

1. Windmill turbines generate electricity by using the energy of water flow . ( )
2. Both modern wind turbines and old windmills are used to generate electricity. ( )
3. All devices need energy to do their functions. ( )
4. Both wind movement and water flow has kinetic energy. ( )
5. The low cost of the energy used in watermills is from the disadvantages Of using this energy. ( )

Worksheet (11)

- **Write the scientific term of each of the following :**

1. The gas layer at the Sun's surface where the light we see is emitted.(…………………)

2. Huge bodies in the space made mostly of hydrogen and helium

   gases. (……………………)

- **Put (✓)or (X):**

1. Solar panel consists of one small solar cell. (   )
2. Plants need water only to grow. (   )
3. Looking directly at the Sun is very dangerous. (   )
4. Plants can grow if they are placed in dark areas for several weeks. (   )

- **Complete the following sentences :**

1. The Sun is necessary for the growth of ……………..Which is eaten by animals.
2. In some villages, solar panels are used to generate ……………..energy that is used To operate………………… Equipment.
3. The reaction between hydrogen and helium gases at very high temperature in
   the Sun produces large amounts of …….. ... energy and………..energy.

- **Give reasons for:**

1. Sunlight is very important for plants and animals.
   ……………………………….,……………………………………………………………
   ………………………………………………………………,………………………………
2. Sometimes the Sun is not visible in the sky but you can feel its warmth.
   ……………………………….,……………………………………………………………
   ………………………………………………………………,………………………………

Worksheet (12)

- **Choose the correct answer :**

1. Kinetic energy created by ……………. movement is used to rotate the blades of Windmills.

   A. the moon B. stars C. water. D. Wind

2.The electrical energy is transmitted from windmills to house through …………………

   A. water. b. wind C. Coal. d. wires.

3. When wind..... .. .. energy increases, the windmill blades spin more quickly.

   a. Kinetic b. potential. C. chemical. d. solar

4. The change of energy in an.................. . is opposite to the change of energy in a wind turbine.

   a. electric bell. b.electric heater. c. electric iron. d. electric fan

- **Complete the following sentences**

1. Wind is formed due to the effect of .. ……………………energy coming from the ………………….. In the Form of rays.
2. By decreasing the number of blades, the speed of rotation of turbine blades Will ………………
3. By increasing the rotation of windmill blades, the wind turbine generates more……………. energy.
4. When the wind turbines rotate, . .. …………….energy is converted into.................. energy.

- **Correct the underlined words:**

1.Potential energy of the wind is converted into electrical energy by wind turbines. (……………………….)

2. When air blows into the wind turbine from the side, the blades spin slowly. (……………………….)

3. Water turbines rotate when the windmill blades rotate. (…………………………)

4. The difference in temperature between cold and hot air causes air to stop. (……………………….)

Worksheet (13)

- **Choose the correct answer:**

1.Theason of flowing of river water downhill is the…force.

a. pushing b. friction. C. gravitational d. electrical

2. Both waterfalls and……….. are renewable energy resources.

a. wind b. coal. C. oil d. fossil fuel

3. In water turbines, the………………Energy of water is changed into electrical energy.

a. chemical b. kinetic. C.thermal d. light

- **Correct the underlined words :**

1. The thermal energy generated by water turbines in dams is known as hydroelectricity. (…………………………..)
2. Dams are built on rivers in order to generate solar energy. (…………………………)
3. The electrical energy is generated by wind turbines in dams. (…………………………)

- **Put (✓) or (x):**

1. Waterfalls are considered as non-renewable energy resources. ( )
2. The flow of water can be controlled to generate electricity in dams. ( )
3. Electrical energy can be generated from both waterfalls and wind movement. ( )

Worksheet (14)

- **Put (✓) or (X) :**

1. Waterfalls are non-renewable energy resources.(   )
2. Running water in rivers has kinetic energy. (   )
3. The evaporated water from rivers can return back to rivers in the water cycle. (   )
4. The energy produced from wind turbines is known as hydroelectric energy. (   )

- **Write the scientific term of each of the following :**

1. The evaporation and condensation of river water, then returning Then returning Back to rivers through rainfalling. (…………………………….)
2. A process in which water changes into water vapour. (…………………………….)

- **Choose the correct answer:**

1. If The speed of moving water changes from 5m/sec. to..............m/sec, its kinetic Energy will increase.
a. 2.   B. 3   C.4   d.6
2. The form of energy resulted from waterfall is called……………. energy
A. thermal.   B. chemical.   C. solar.   D. hydroelectric
3. River water evaporates by the help of heat produced from
A. kettles.   b. the Sun.   C. electric heaters.   D. electric iron.

Worksheet15

1-Put (✔) or (x):

1. The surface of the Earth changes from time to time.(   )

2. When large particles of rocks are broken into smaller particles, they can be carried by the moving wind.(   )

3. The water stream can break down rocks into smaller pieces.(   )

4. If you walk on the seashore and come the next day searching for your footprints, you will find them unchanged.(   )

2-Write the scientific term of each of the following:

1. The disappearance of a sandcastle as a result of its hitting with the

   sea waves. (…………………………………….)

2. They are deep valleys carved by flowing water.(…………………………….)

3. It is a model that can be built on seashores using sand and may

   disappear easily by sea waves. (…………………………….)

Worksheet (16)

1- Choose the correct answer:

1. All the following are processes that can change the Earth's surface, except……….

a. digestion. b. erosion. c. weathering d. deposition.

2. The condition of the atmosphere, including temperature, wind, and rains, is known as…….

a. weather. B. weathering. c. erosion. d. deposition.

3. Rusting of a statue is an example for the action of ……….. process.

a. deposition. b. erosion

c. mechanical weathering. d. chemical weathering

4. When water freezes, it expands. This means that…………….

a. it will evaporate. b. its temperature increases.

c. its volume increases. d. its volume decreases.

2-Give reasons for

1. Iron in rocks may rust.

………………………………………………………………………………………………….

2. Water plays an important role in the formation of limestone caves.

………………………………………………………………………………………………….

Worksheet (17)

1-Complete the following sentences

1. Cracks caused by freezing of water and melting of ice represent……………………….weathering.

2. In the……………………… Weathering, the chemical structure of rocks doesn't change

3. Formation of limestone caves is an example of…………….weathering.

2-Put (✔) or (x):

1. Roots of plants can slowly grow over time through small cracks in rocks, causing chemical weathering(   )

2. When water freezes, its volume increases.(   )

3. The reaction between oxygen and the iron of some rocks causes its chemical weathering.(   )

Worksheet(18)

1-Write the scientific term of each of the following

1. It is the process by which natural forces move weathered rocks and soil from one place to another.(……………………………..)
2. It is the process in which weathered rocks and soil are laying down or dropped by wind, water, or gravity.(……………………………..)
3. A fan-shaped (triangular) mass of sediment that is formed where a river enters a larger body of water like seas.(……………………………..)
4. A hill of sand created by the wind. .(……………………………..)

2-Complete the following sentences

1. Wind,………………………..and gravity are natural factors that control the erosion process.

2. Sand grains………………………on the ground when the wind carrying it stops.

3. Sediments are mixed with the remains of………………..and……………………..forming layers at the bottom of oceans and lakes.

4. Blowing of strong……………………….in the desert may form large sand dunes.

3- What happens when….?

1. More and more layers of sediments settle on the bottom of oceans, lakes, and in deserts.

   ……………………………………………………………………………………………….
2. A river carries sediments meet a sea.

   ……………………………………………………………………………………………….

Worksheet (19)

1-Choose the correct answer:

1. As a result of breaking down of…………….Sand is formed.

a. plastic b. rubber

c. rocks d. glass

2. A condition of atmosphere, including temperature, wind, and rains, is known as……….

a. weather b. weathering

c. deposition d. erosion

3. The breakdown of rocks, either mechanically or chemically, is known as…………….

a. photosynthesis. b. weathering.

C. erosion. d. deposition.

4. When a river meets a sea or an ocean, a………….. is formed.

a. canyon b. volcano

C. mountain d. delta

2-Put (✔) or (x)

1. The surface of the Earth never changes.(   )

2. Limestone caves are formed as a result of chemical weathering.(   )

3. When water freezes, its volume decreases. .(   )

Worksheet (20)

Q1: Choose the correct answer:

1. A canyon may be formed due to the effect of..........

a. erosion and deposition. b. weathering and erosion.

c. weathering and deposition d. deposition only.

2.A canyon can be formed by the effect of.. ...

a. water only. b. wind only.

C. water and wind. d. water and Sun

3.A canyon may take .... of years to be formed.

a. hundred's b. tens

C. millions d. couple

4 .If the rain falls over a small canyon for several times per year......... ‘

a. its depth increase. b. its depth decrease.

C. it becomes flat. d. it is not be affected.

5. Wadi Nakhr in Oman is formed because water move................ away by the effect of erosion.

a. sunlight b. wind

C. sediments d. mountains

6 .Among canyons which has V-shape are............ .

a. Wadi Nakhr and the Small Canyon. b. the Colored Canyon and Wadi Rum. c. the Small Canyon and the Colored Canyon.

d.Wadi Nakhr and Wadi Rum.

7 .Among the evidences for the beginning of formation of small canyon by effect of running water is................

a. the deep sloped of its sides. b. trees and plants that are growing on its sides.

c. the little amount of rains that flow over it. d. the rocks and sediments that are found on its sides.

8.If the big rocks of a mountain were broken off, this is an evidence of...........

a. weathering process only. b. erosion process only.

C. weathering and erosion processes. d. weathering and deposition processes.

Q2 Write the scientific term of each of the following:

1 .It is the landform that is formed by the effect of weathering and erosion due to wind, water or other factors.

2 .The two processes that have the main role in formation of canyon.

Worksheet (21)

Q1. Put true or false:

1 .The Grand Canyon in USA is very large and steep.

2 .Rivers cause less erosion of rocks than small streams.

3 .The river movement can take the rocks away around mountains.

٤. The Grand Canyon took short period of time to be formed.

5 .Canyon is a type of dunes which has steep sides.

Q2 .Write the scientific term of each of the following:

1 .It is a special type of valleys which its sides are steep. (   )

2 .It is a very large and steep canyon which is found in United States of America .   (   )

Worksheet 22

Q1 Complete the following sentences by using the words below :

(sand – speed - deposition - rivers canyon – silt)

1 .Both of valleys and canyons often have…..............or streams flow through them lowest points.

2 .Deltas are formed when the............ of the river water decreases, which causes deposition of sediment.

3 .The plants of wetland and their roots cause increase of the rate of ....process.

4 .When the sides of a valley become steep, this valley may be changed into a............

5.Fast flow rivers carry sediments which called........... and it is made of very fine bits of............clay or rock materials.

Q2 Give reasons for:

1. Geologists study the layers of rocks in the canyon walls
   ....
2. Plants of wetland areas help in formation of deltas
   ....

Worksheet 23

Q.1 Choose the correct answer

1 .the process of carving the rock into different shapes by wind blowing is........

a. deposition. b. weathering. c. erosion. d. transportation.

2 .Sand dunes are formed by the effect of both. .... processes

a. mechanical weathering and deposition b. erosion and weathering

C. erosion and deposition d. chemical weathering and erosion.

3.When the force of wind blowing......... the sand travels for a longer distance

a. decreases b. becomes zero

c. doesn't change of the wind blowing. d. increases

4. Formation of sand dunes depends on...............

a. force only b. direction only

C. both force and direction d. neither force nor direction

5 .Sand dunes are common landforms between.............. environments.

a. beach and rainforest b. beach and sandy desert

C. rainforest and sandy desert d. sandy desert and oceans

6 .When a rock blocks the path of flying sand, a.............. may be formed.

a. dune b. river c. valley b. canyon

Q.2 Put (√) or (X):

1 .Wind can pick up sand grains in forming sand dunes. ( )

2 .Sand dunes are the landform that can be seen in both beach and sandy desert . ( )

3 .Sand dunes are formed by erosion only. ( )

4 .Sand travels for a short distance when wind blows with a great force.( )

5 .Sand dunes usually seen separately, and may cover a small area. ( )

6 .Wind cannot break down rocks. ( )

Worksheet 24

Q1Complete the following sentences by using the words below

(layers _sedimentary- whales – formation)

1 .Wadi Al-Hitan formed from........rocks as sandstone and limestone.

٢. Among the fossils that are present in Wadi Al-Hitan are large skeletons of................

3.At Wadi A-Hitan, the newest rocks are found at the top of the.................

٤. Geologists called each separated rook layer in sedimentary rocks a...............

Q2 Give a reason for the following

1. Geologists study the layers of sediments in rock formations،
2. The oldest rock layers of Wadl Al-Hitan contain fossils of whales.

Model answer

Worksheet (1)

- **Choose the correct answer:**

    1. d   2.a .   3.c   4.a   5. d

- **Correct the underlined words :**

    2. Sun   2-Batteries   3Mars

- **Complete the following sentences:**

    1- Changed
    2- Chemical – electrical – kinetic
    3- Electrical
    4- Battery
    5- Electrical

- **Put (✓) or (x) :**

    1- (X)   2-(✓)   3-(X)   4- (✓)   5- (X)   6- (✓)

- **Give reasons for:**

    1. Because sunlight is converted into electrical energy.
    2. Because the chemical energy stored in battery is converted into electrical energy in turn changes into kinetic energy.

Worksheet (2)

- **Write the scientific term:**

1. The sun .   2.Thermal energy.   3. Coal.
4. Electrical energy.   5. Chemical energy.

- **Complete the following sentences by using the words from the brackets:**

1- Electrical
2- Potential – kinetic
3- Kinetic – sound
4- Kinetic – thermal
5- Heat
6- Light- thermal

7- Sun

- **What happens if…?**

1.The chemical energy is converted into thermal energy and light energy.

2.The kinetic energy converted into sound energy.

- **Put (✓) or (x) :**

1- (✓)   2-(X)   3-(X)   4-(✓)   5-(✓)

6- (X)   7-(✓)   8-(X)   9-(X)   10-(✓)

Worksheet (3)

- **Write the scientific term :**

1. Sound energy   2.Light energy   3.Kinetic energy

- **Choose the correct answer:**

1. B   2.D   3.B   4.A

- **Complete the following sentences:**
  1- Chemical – kinetic
  2- Electrical – thermal
  3- Conservation of energy
- **Give reasons for :**
  1- Because the electrical energy is converted into thermal energy.
  2- Because battery is the source of energy that is used to operate the toy car
- **What happens if…?**
  - You feel warm .

Worksheet (4)

- **Put (✓) or (x) :**
  1- (X)
  2- (✓)
  3- (X)
  4- (✓)

- **Write the scientific term:**

1- Thermal energy 2.Thermal energy

2- Kinetic energy 4.Electrical energy

- **Choose the correct answer:**

1- A 2-C 3-C 4-a

- **What happens if…?**

1- The electrical energy is converted into kinetic energy.

2- Some energy is wasted as thermal energy .

- **Give reasons for:**

1- Because it doesn't help the mobile phone do its main function.

2- Because they don't help the blender do its main function .

Worksheet (5)

- **Correct the underlined words:**

1- Thermal energy 2-Thermal energy

- **Put (✓) or (x) :**

1- (✓) 2-(X) 3-(✓) 4-(X)

- **Choose the correct answer:**

1- B 2-C 3-D

- **Complete the following sentences:**

1- Thermal – kinetic 2-Coal- wood

- Give reasons for:

1- Because fuel burns inside the engine to produce the thermal energy that is changed Into kinetic energy.

2- Because the fuel in the car tank runs out.

3- To produce thermal energy which causes the car to move.

Worksheet (6)

- **Choose the correct answer:**

1. D 2.A 3.B 4.A 5.C

- **Complete the following sentences:**

1- Solar energy – renewable – natural gas 2-Liquid

3-Biofuel – fossil fuel 4-Non-renewable

- **Correct the underlined words:**

1- A small 2-The sun 3-Plants 4-Decreased 5-Biofuel

- **Put(✓) or (x) :**

1. (X) 2. (X) 3. (✓) 4.(X) 5.(✓)

- **Read the following paragraph, then choose the correct answer:**

1. a 2- a. 3- d.

Worksheet (7)

- **Put (✓) or (x) :**

1. (✓) 2. (X). 3.(✓). 4. (✓)

- **Arrange the following sentences:**

3 , 1 , 5 , 2 , 4

- **Write the scientific term:**

1. Water. 2. Fossil fuel. 3. Turbine

- **Correct the underlined words:**

1. Natural gas. 2. Renewable. 3. Steam. 4. Heat

- **Choose the correct answer:**

1. C. 2. D 3. B. 4. A. 5. D. 6. C.

Worksheet (8)

- **Choose the correct answer:**

1. B. 2. B. 3. A.

- **Complete the following sentences by using the words:**

1. Fish 2. Carbon dioxide. 3. Soil – acid 4. Smog

- **Write the scientific term:**

1. Respiratory system 2. Global warming

Worksheet (9)

- **Give one example for each other the following:**

1. Walking or biking. 2. Coal. 3. Not increasing the earth's temperature

- **Correct the underlined words:**

1. Non renewable resources. 2. Increase 3. Pollute.

- **Give reasons for:**
    1. Because when fossil fuel is burned it emits gases that cause air pollution
- **What happens if…?**
    1. The using of renewable resources of energy will not cause an increase in the earth's temperature
    2. Fossil fuel will run out on the earth .

Worksheet (10)

- **Choose the correct answer:**

  1. A. 2. B. 3. A
- **Correct the underlined words:**

  1. Solar 2. Low. 3. Electric.
- **Put (✓) or (x) :**

  1. (X) 2. (✓). 3. (✓). 4. (✓). 5. (X)

Worksheet (11)

- **Write the scientific term:**

  1. Photosphere. 2. Stars
- **Put (✓) or (x) :**

  1. (X). 2. (X). 3. (✓). 4. (C)
- **Complete the following sentences:**

  1. Plants. 2. Electrical – irrigation 3. Light – thermal
- **Give reasons for?**
    1. Because without sunlight plants will die ,and then animals that eat them will die also
    2. Because the atmosphere absorbs the sun's energy then land and water absorb this energy.

Worksheet (12)

- **Choose the correct answer:**

1. B. 2. D. 3. A. 4. D

- **Complete the following sentences:**

  1. Radiant – sun 2. Increase. 3. Electrical. 4. Kinetic – electrical

- **Correct the underlined words:**

  1. Kinetic. 2. Front. 3. Wind. 4. Move

Worksheet (13)

- **Choose the correct answer:**

  1. C. 2. A. 3. B

- **Correct the underlined words:**

  1. Electrical. 2. Electrical 3. Water

- **Put (✓) or (x) :**

  1. (X) 2.(✓). 3. (✓)
  2.

Worksheet (14)

- **Put (✓) or (x) :**

  1.(x) 2. (✓). 3. (✓). 4.(X)

- **Write the scientific term:**

  1. Water cycle 2. Evaporation

- **Choose the correct answer:**

  1. D. 2. D. 3. B

Worksheet15

1-Put () or ():

1- √ 2- √ 3-√ 4-x

2-Write the scientific term of each of the following:

1-Erosion of the sandcastle.

2-Canyons

3-Sandcastle

Worksheet16

1- Choose the correct answer:

1-a 2-a 3-d 4-c

2-Give reasons for

1-Due to the reaction between iron and oxygen of air.

2-Because water dissolves minerals in rocks, then this dissolved minerals combine again forming new shapes.

Worksheet17

1-Complete the following sentences:

1-mechanical 2-mechanical 3-chemical

2-Put (□) or (□):

1-x 2-√ 3-√

Worksheet18

1-Write the scientific term of each of the following:

1-Erosion 2-Deposition 3-A delta 4-A sand dune

2-Complete the following sentences

1-water 2-fall 3-plants-animals 4-wind

3- What happens when….?

1-The sedimentary rocks are formed.

2-A delta is formed.

Worksheet19

1-Choose the correct answer:

1-c 2-a 3-b 4-d

2-Put (□) or (□):

1-x 2-√ 3-x

Worksheet20

1-Choose the correct answer:

1.b 2.c 3.c 4.a 5.c 6.b 7.b 8.a

2. Write the scientific term of each of the following:

1. canyon 2. Weathering and erosion processes

Worksheet21

1-Put true or false

1.(√) 2. (x) 3. (√) 4(x) 5(x)

2-Write the scientific term of each of the following:

1. Canyon 2. The grand canyon

Worksheet22

1. complete :

1.River 2. Speed 3. Deposition 4. Canyon 5-Silt _sand

2.Give reason for :

1.to learn about kind of living things existed there long ago

2.because they help in increasing the rate of deposition process

Worksheet23

1. choose the correct answer :

1.b 2.c 3.d 4.c 5.b 6.a

2.Put true or false

1.(√) 2. (√) 3.(x) 4(x) 5(x) 6(x)

Worksheet24

1 . complete

1.Sedimentary 2.Whales 3.Layers 4.Formation

2. Give reason

1. to know how the landscapes looked like in the past

2. because in the past a deep sea was existed at wadi alhitan